

# ***Southern Power & Industry***

The Industrial and Power Journal of the South and West

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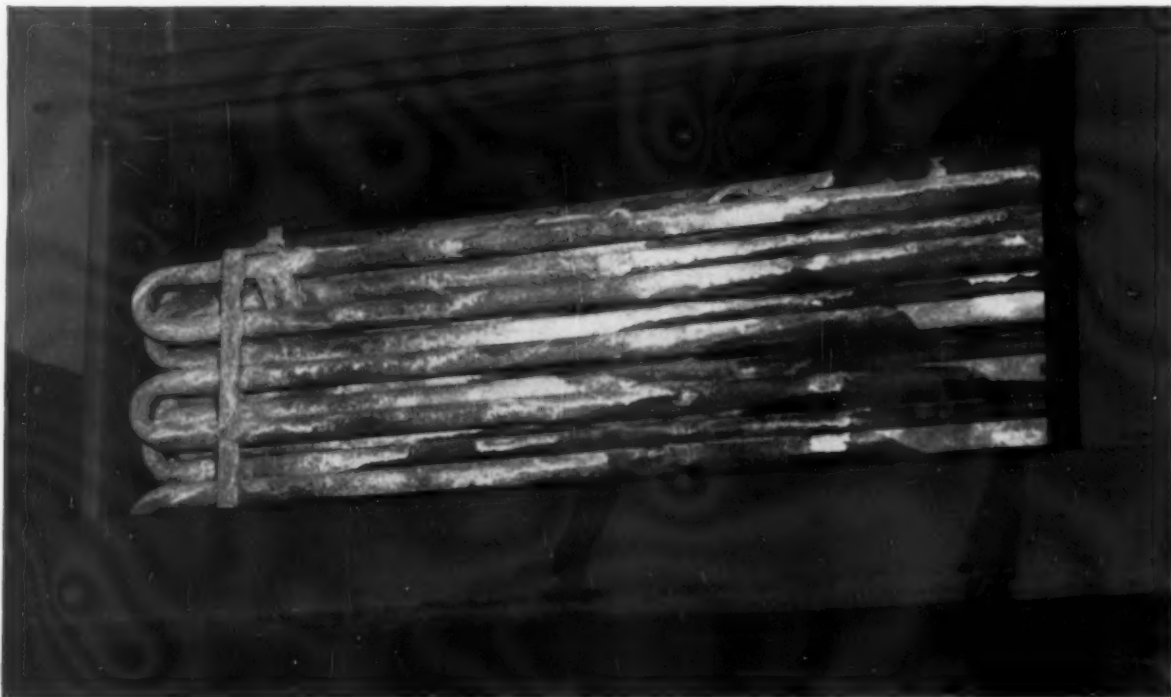


## **FROM FIELD TO FACTORY IN SEVEN MONTHS**

Teamed-up to build this multi-million dollar plant in South Carolina — the plant engineer, consultant and contractor saved fourteen months time and cut the construction cost thirty per cent — Page 30.

# COOLEX & SR-2

## will save your company money



## Prevent SCALE and CORROSION

Corrosion and scale take an expensive toll in maintenance and repairs on cooling water systems and air washers. Scale can ultimately reduce the efficiency to a point of complete breakdown of your system. Of more immediate concern, rust and scale formations act as insulators and reduce heat transfer to an ineffective minimum. Capacity is lowered, operating costs are increased. Coollex and SR-2 will keep this from happening.

Coollex and SR-2 are dollars and sense, preventive maintenance products that prevent scale and corrosion in cooling water systems and air washers by neutralizing the effects of scale-forming and corrosive elements. Coollex

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If you want to know more about these money-saving products, there are competent ANCO service representatives throughout the South ready to serve you. Call or write to one of the offices listed below and the ANCO representative near you will be glad to come by and give the full story. A simple preventive maintenance program now built around Coollex and SR-2 may well save you hundreds of dollars in replacement expense later.

*Write today and request an Anderson service engineer to make an analysis and recommendations on your plant's water treatment. There is no cost for this service.*

**SPECIALISTS IN MAKING  
WATER BEHAVE**



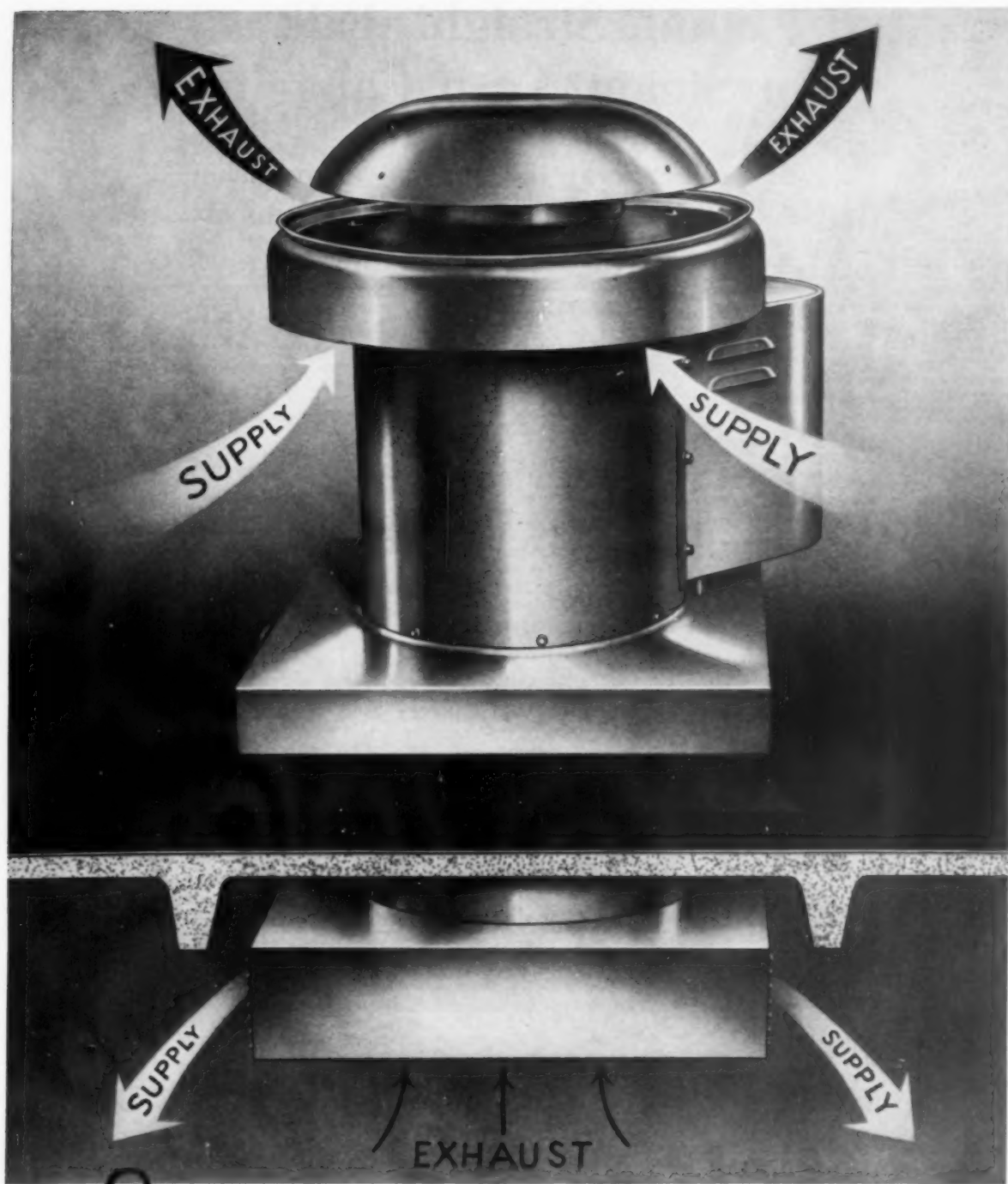
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You get both air supply and exhaust simultaneously with the new Clarage TWINALATOR\*. Unique, superior dual function air handling for all types of buildings. Definite money-saving advantages: Requires only one opening, one motor, one drive, one starter. No make-up air unit neces-

sary. Applications unlimited — well adapted to closed or semi-closed systems. Can be provided with heating coils and filters. Write today for Bulletin 552. CLARAGE FAN COMPANY, Kalamazoo, Michigan. Clarage sales engineering offices are located in all principal cities.

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# Some Straight Talk On Steam Trap Capacity

...or pulling away the curtain of confusion  
that surrounds steam trap capacity ratings.

Unfortunately, for the steam trap buyer, the subject of steam trap capacity has become cloudy and confused by a landslide of claims, counter-claims and inconsistent "standards" for measurement. So let's take a cold hard look at this subject so vital to the efficient operation of your plant.

## What Determines Steam Trap Capacity?

There are three factors that determine the capacity of a steam trap:

1. The area of the orifice.
2. The density of the condensate.
3. The pressure differential across the trap.

Let's take a closer look at each of these:

**Area of orifice** is usually specified by the trap manufacturer or can be calculated from the diameter. Nothing complicated here.

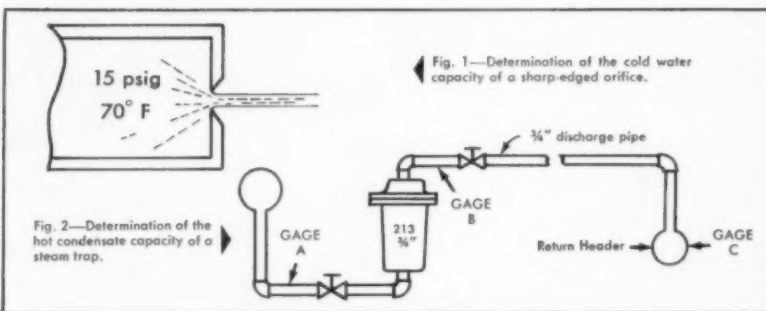
**Density of condensate** depends on temperature. A cubic foot of cold water weighs 62.4 lbs. At 250° F. or 15 psi, it weighs less than 59 lbs. This is important. Don't overlook it.

**Pressure differential across the trap** is most significant. And it is complicated by the many factors that affect it, such as:

1. Pressure drop between unit drained and the trap when the trap valve is open.
2. Distance the trap valve is moved from the valve seat.
3. Back pressure on the trap with orifice closed; i.e., return header pressure.
4. Increase in back pressure produced by condensate and flash steam flowing in the discharge line. This in turn is affected by the diameter and length of the discharge line, plus friction caused by valves and fittings.

## Orifice Capacity Vs. Steam Trap Capacity

Figure 1 shows a ½" diameter sharp-edged orifice at the end of a pipe filled with cold water at 15 lbs. pressure. The capacity of this orifice, using a .61 coefficient of flow would be 8,800 lbs. per hr. Now, would this ½" orifice if used in a ¾" steam trap installed as shown in Figure 2 provide the trap with a continuous discharge capacity of 8,800 lbs. of hot condensate per hour? The answer is



"no". And here are some of the reasons why:

**Density of condensate.** As pointed out above, cold water weighs 62.4 lbs. per cu. ft. At 15 lbs. pressure and 250° F. water weighs less than 59 lbs. per cu. ft. This difference in density alone reduces the lbs. per hour capacity of the orifice by over 5%.

**Pressure differential across the trap.** With the trap valve closed we have a static pressure differential of 15 psi. The trap valve must be able to open against this pressure. However, this is not the pressure differential that will determine the capacity of the trap valve.

The ¾" discharge line will be full of a mixture of flash steam and condensate. To keep this mixture flowing from the trap outlet to the return line requires a pressure differential. In actual capacity tests run as shown in Figure 2 Gage B at the trap outlet registered 11 lbs. back pressure. Thus the true pressure differential across the trap was about 4 lbs. Under these conditions the measured capacity of the trap was 4,340 lbs./hr. or just about half of the capacity of the ½" orifice for cold water.

## How Armstrong Determines Capacity Ratings

Armstrong trap capacity ratings are based on hundreds of tests under actual operating conditions. In these tests, the condensate used was at the steam temperature corresponding to the test pressure. Thus, the capacities determined take into account the pressure drop that occurs when the trap orifice opens and the choking effect and back pressure of the flash steam. Actual installation hook-

ups were used so that pipe friction in both inlet and discharge lines as well was reflected in the results.

Let's go back to the example cited above and in Figure 2. The trap referred to is an Armstrong No. 213. While it did test out at 4,340 lbs. per hour for a static pressure differential of 15 psi, it is rated in the catalog at only 3900 lbs. per hour for this pressure—just to be on the safe side.

For the trap buyer, this means that Armstrong Steam Trap capacities are based on handling condensate at steam temperature for the stated static steam pressure differential under actual working conditions.

Capacity ratings which don't take into account all of the variables will be misleading and may lead to the selection of undersized traps. So whenever you specify or buy traps be sure that the capacity ratings you work from are realistic. One way to be sure is to select Armstrong Traps with guaranteed capacity ratings.

\*\*\*

Additional information on trap capacity ratings, plus data on how to correctly size, install and maintain steam traps for any pressure, any temperature and any load, are presented in the 48-page Armstrong Steam Trap Book. Ask your local Armstrong Representative for a copy or write:

Armstrong Machine Works  
8068 Maple Street  
Three Rivers, Michigan



**ARMSTRONG  
STEAM TRAPS**

See our Catalog in Sweets Plant Engineering File



**BPA****NBP**

# Southern Power & Industry

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Eugene W. O'Brien  
Managing Director

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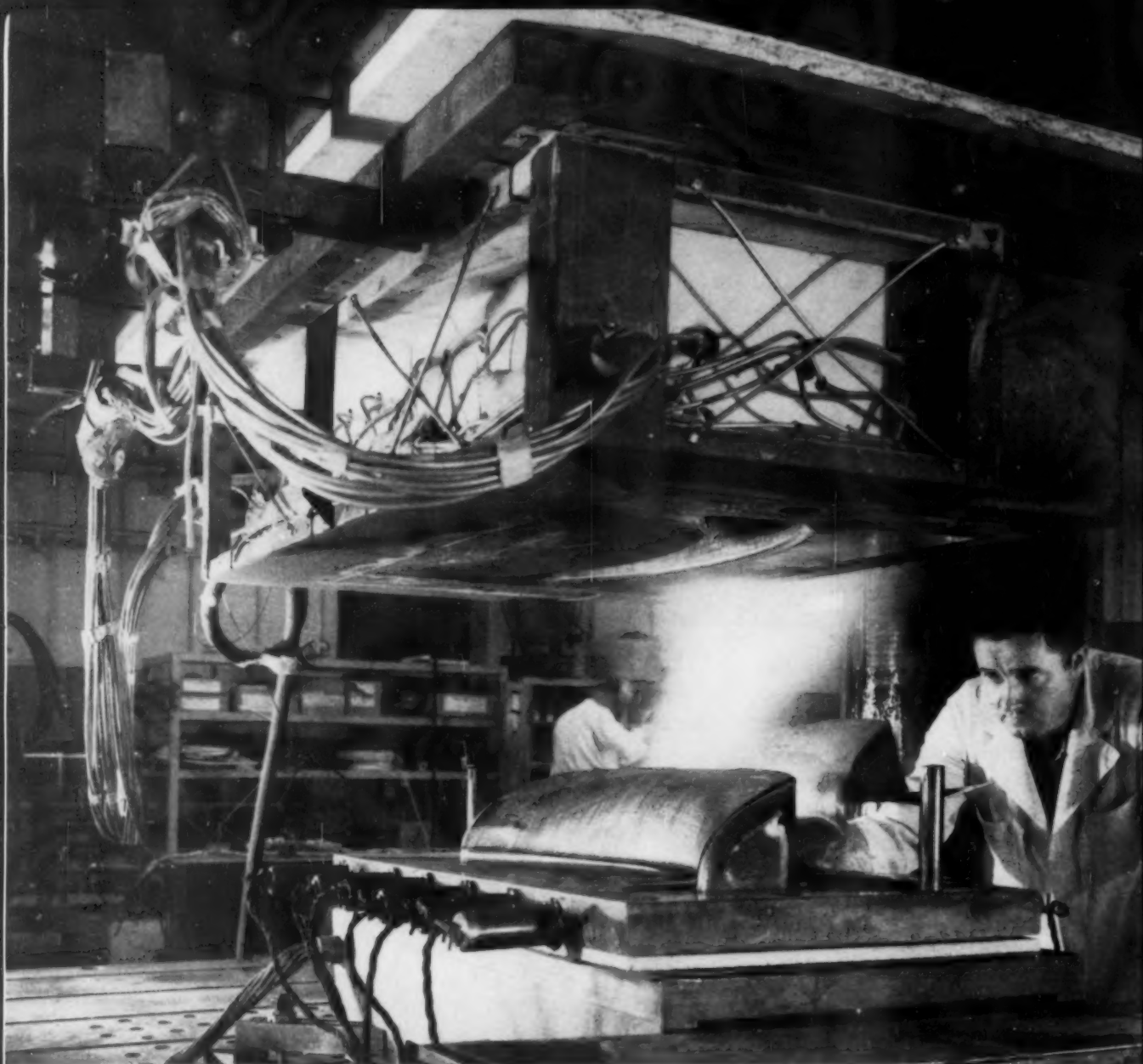
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SOUTHERN POWER & INDUSTRY for APRIL, 1961



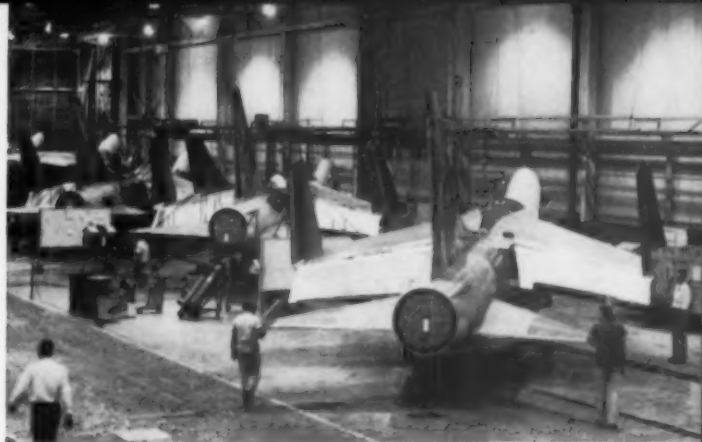
## Gulf Harmony<sup>®</sup> oil has the extra stability press operation at Chance Vought...

Chance Vought Corporation, Dallas, Texas, developed a unique production technique to speed production of jet fighters. It's a 1000-ton press with electrically heated dies that permits the forming and stress-relieving of a titanium part in one operation.

However, this advanced technique created several problems. One, according to Doy Stanley, General Foreman, Facilities, was the heavier burden placed on operating parts of the press. When forming and stress-relieving were combined in one operation, high

temperatures and pressures had to be applied for long periods of time. Under these conditions, maintenance of the press is very important. According to Mr. Stanley, "We've always stressed efficiency in our operation. And downtime is, as you might say, doubly inefficient."

Proper lubrication of hydraulic mechanisms and other press parts subjected to elevated temperatures and pressures is a must to keep production right on schedule. Says Mr. Stanley: "We have never had any



F8U Navy fighters near the end of the assembly line. Aircraft's leading edges use titanium part that has been formed and stress-relieved in one operation.



Doy Stanley, left, discusses hydraulic oil applications with Grover Garrison, Gulf Sales Engineer. Hamilton Press shown in background is one of various presses at Chance Vought that use Gulf Harmony oil.

On this 1000-ton press, simultaneous forming and stress relieving of titanium takes place at 1000 deg. F. Quality Gulf Harmony oil protects the vital hydraulic system.

## needed for high temperature GULF MAKES THINGS RUN BETTER!

downtime, or any trouble at all that can be attributed to lubrication. This excellent record is due mainly to the fact we use a high quality hydraulic oil that won't break down under heat."

That "high quality hydraulic oil" Mr. Stanley refers to is Gulf Harmony. It not only withstands heat, but resists oxidation, which improves service life and prevents sludge formation. Also, a corrosion inhibitor guards against rust, and an anti-foaming additive assures a smooth transfer of power.

If you have problems involving hydraulic fluids, or any petroleum product application, may we have the opportunity to prove to you that Gulf makes things run better! Call your nearest Gulf office, or write us for additional information.

**GULF OIL CORPORATION**  
Dept. DM, Gulf Building  
Houston 2, Texas





# Facts and Trends

April, 1961

- ◆ **CONTAINERIZATION**—The shipping industry can point to some positive achievements in its battle to meet foreign competition, according to the latest Business Conditions Bulletin of the Alexander Hamilton Institute and is also moving ahead in new ship construction even though a number of vessels are still idle. Last year, 26 new ships were completed.

Helping to rectify the imbalance between American and foreign shipping was the introduction of containerization. By stowing related cargo in large 20 or 40 foot containers on the wharves—or better still at the factory—and then hoisting these aboard ship by dockside or mobile cranes operated from the ships, a great deal of dock labor and loading time is eliminated. Less turn-around time in port means a higher rate of financial return.

- ◆ **STATIC SEALS**—A composite of two metals whose combined properties meet the requirements for seal applications in temperatures up to 1200 F and pressures of 5000 psi has been developed by Armour Research Foundation.

The composites are made by impregnating a porous body of fiber metal with a soft metal. The resiliency of the fiber metal skeleton combines with the softness and conformability of the impregnant to offer a seal material for almost any static high temperature-high pressure purpose.

- ◆ **TAX REFORM**—Major reform of the "jerry-built" federal tax system would spur the economy and help create much-needed jobs, according to Arthur H. Motley, President of the Chamber of Commerce.

It takes \$10,000 to \$20,000 in initial investment to put an employee in a job. Consider this need, and then look at how our individual income tax rates are set up. These rates weaken the incentives to save and to invest. We have the highest individual income tax rates in the world: up to 91 per cent on the tax dollar in the top bracket—and that's before state and sometimes local income taxes.

- ◆ **STUCK-UP**—Homes held together by glue are part of the vision of the future unveiled by Philip Will, Jr., President of the American Institute of Architects, at aluminum's 75th anniversary celebration.

A successful aluminum wall system will require that every part do double or triple duty. Imagine, for example, an exterior skin which would be stressed in tension, serve as the appearance surface and also, like the human skin, sweat a little to cool the building in summer. Interior surfaces can have permanent vinyl coatings, incorporate radiant heating and cooling and convenience wiring plus luminescent panels for lighting. The structure would be assembled with glue, factory applied along panel edges and temporarily protected against premature setting by removable strips of tape.

(Continued on page 8)





This compact Package Air Preheater is being installed on a 150,000 lb/hr boiler at Olin Mathieson Chemical Corp.'s Brandenburg, Kentucky, petrochemical plant. When in operation it will recover enough heat from the boiler exhaust to increase efficiency of the boiler between 8% and 9%.

## **OLIN MATHIESON RECOVERS 360°F FROM BOILER EXHAUST WITH 11½' x 11' x 8' PREASSEMBLED LJUNGSTROM® PACKAGE AIR PREHEATER**

Olin Mathieson specified a Ljungstrom Package Air Preheater because it saves space as well as fuel. Mathieson's Ljungstrom occupies only about 1000 cubic feet, but cuts boiler exhaust temperature from 680°F to 320°F — puts 360° of heat back to work in the boiler.

The compact preassembled Package Air Preheater is ready to run when it's delivered—just connect to the power line and ducts, and it's on-stream. You make big savings on installation because there's no on-the-spot erection.

You can use a Ljungstrom Package Air Preheater on boilers from

25,000 to 250,000 pounds of steam per hour. For more information, write today for your free copy of a 14-page booklet.

**THE AIR PREHEATER  
CORPORATION**

60 East 42nd Street, New York 17, N. Y.

## Facts and Trends (Continued)

- ◆ **ENGINEERS' SALARIES**—The very interesting February News Letter of NSPE deals extensively with engineers' salaries. One tabulation indicates that current graduates get about \$520 per month, whereas those ten years out of college get \$849—or \$319 additional for ten years' experience.

While no "ancient" figures are presented—it is remembered that back in the 1920's the percentage gain for ten years' experience after graduation was something like 400%, compared to the above indicated current progress rate of 160% in ten years. So it seems that colleges have done very well in the earning power race—much better than experience.

- ◆ **LIKE GRAY HAIR**—New thyatron and diode tubes, which predict tube failure 300 hours ahead of time, have been announced by Reliance Electric and Engineering Company.

These life indicating tubes change color from normal blue to neon red before failure and thus allow ample time for replacement in order to minimize the possibility of machine downtime. Tests in service also indicate that tube life has been doubled as a result of new design and manufacturing techniques.

- ◆ **INDEPENDENT HEATER**—A new gas furnace that drives its own blower with power from a thermoelectric generator is under development by the C. A. Olsen Manufacturing Company. The 130 watt generator converts the heat of burning gas directly into electricity.

This application of thermoelectricity to a gas-fired, forced-air furnace promises a number of significant improvements to the conventional home heating unit. Reliability of the new unit is greatly increased because it doesn't depend upon an external electric power source. When the furnace goes on, power from the generator builds up gradually, starting the blower at a low speed and slowly increasing it. Thus, air delivery will increase gradually both in velocity and temperature until the maximum operation of the furnace is attained.

- ◆ **BUBBLE-FREE DISTILLATION**—Tests just completed prove the "thorough feasibility" of a new distillation process for de-salting sea water, according to General Electric Company.

The new system has as one of its key features an assembly of revolving blades which operate much like an automobile's windshield wipers. Tests demonstrate that the system can extract high volumes of pure water from the sea. Water produced is salt-free to within one part per million. The films of water spread by the revolving wipers are so thin they will not support bubble formation. The bubble-free distillation produces fresh water of exceptionally high purity.

- ◆ **CONVENIENCE COSTS**—Contrary to evidence of the cost of living index, low income families may "get a break" in their food budgets because of the premium priced, ready-to-serve items.

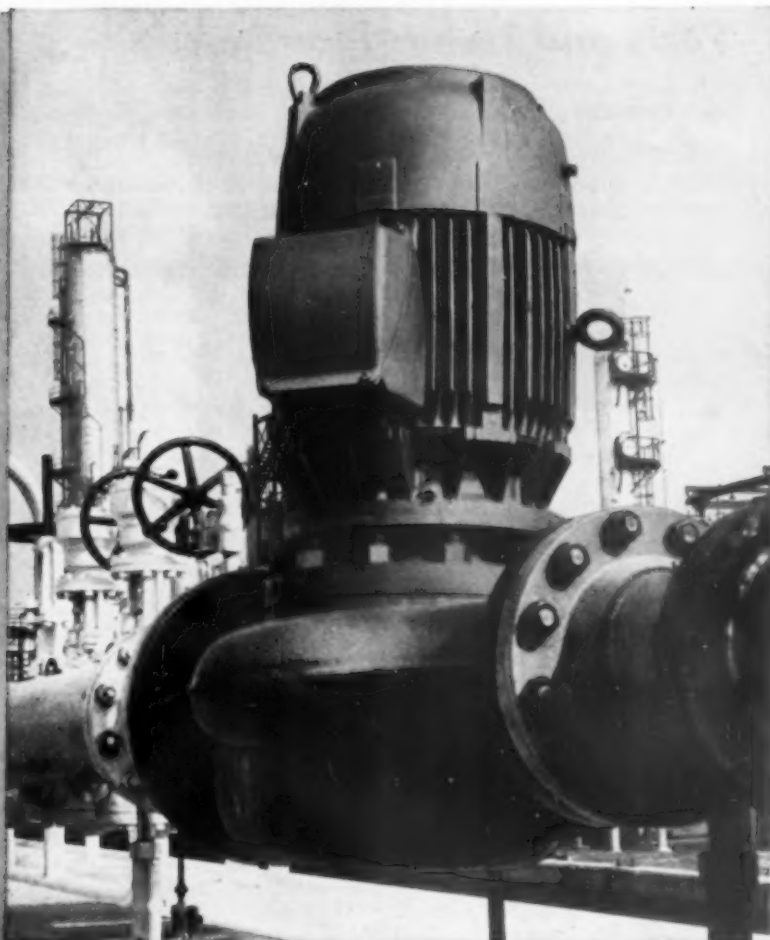
Grocery manufacturers are partially offsetting higher costs of materials and labor by increased production of the "convenience" food items. Sales of convenience foods increased 39 per cent in 1960. Thus increased sales to the higher income families may help hold the line against too great increase in the price of staple items. But the thing to watch is quality. Low grade potatoes in a sack may not even be worth half the price of high quality "ready-to-serves."

(Continued on page 10)

Designed  
for  
best  
Economic  
Balance

NEW

# PACIFIC TYPE SPM Pipe-Mounted Transfer and Process Pumps



**ECONOMIC BALANCE**—an optimum relationship between capital and continuing costs of equipment is especially true in process pumps, whose lifetime operating and maintenance costs may be many times the initial investment. Here are the factors of best economic balance in process pumping offered by Pacific's new pipe-mounted centrifugal pumps:

**LOWER FIRST COST:** Fewer (only six functional) parts • No separate pump bearings or brackets • High degree of interchangeability—minimum inventory.

**LOWER INSTALLATION COST:** No baseplate or foundation required • No field alignment necessary • Integral drive—no motor coupling • Flange-mount and connect to power—that's all.

**LOWER MAINTENANCE COST:** Standardization of seals and shaft-mounted parts • Ready access, even in closest quarters, for field service, or • Easily demounted as a unit for shop maintenance.

**LOWER OPERATING COST:** Each pump impeller designed for peak efficiency in a given application, or • Where low power costs permit, orifice control can be provided to adapt one pump size to a wide variety of applications.

There is only one *true* cost of a process pump. It's the *overall*, lifetime cost of the unit. Make a date with your Pacific Pump representative to discuss the entire pump standardization plan in your plant. He has the broadest line of any in the process field ... and the experience to match.



Write for New Type SPM Bulletin 142

**PACIFIC PUMPS**  
Inc. . . A Division of Dresser Industries, Inc.  
HUNTINGTON PARK, CALIFORNIA, U.S.A.

CP-25

## **Facts and Trends (Continued)**

- ◆ **CHEAPER TEFLON**—E. I. du Pont has announced a price reduction on Teflon resin which is the eleventh reduction since the resin was introduced in 1944. This reduction in resin price to the processors, plus technological advances made in the methods of processing, makes possible the marketing of Teflon basic and special shapes at prices lower than ever before offered.

Processors offer Teflon in a large assortment of sheets, tapes, rods, tubes, gaskets, expansion joints, seals, etc. Large moldings are available—sheets as large as 48" x 48", rods up to 20" diameter, tubes up to 36" diameter.

- ◆ **PHD IN NUCLEAR ENGINEERING**—Nuclear engineering at the University of Illinois "came of age" at the Board of Trustees meeting December 21. The Trustees approved the establishment of an advanced educational program leading to the Doctor of Philosophy degree in nuclear engineering.

The establishment of the new program came two years after the University's initiation of nuclear engineering training at the Master's degree level. During that period 13 degrees have been awarded and physical facilities have come to include the Illinois TRIGA nuclear reactor, three subcritical nuclear assemblies, a heat transfer loop, a radio chemistry laboratory, and a nuclear metallurgy laboratory.

- ◆ **NUCLEAR EXCAVATION**—Research in the practicability of excavating large areas by use of nuclear explosives has been carried out in the past few years by both the Soviet Union and the United States.

A report of a three-year study of nuclear excavation, sponsored by the Atomic Energy Commission, price 75¢, is now available to science and industry through the Office of Technical Services, Business and Defense Services Administration, U. S. Department of Commerce, Washington 25, D. C.

- ◆ **VANADIUM SLAG HAS VALUE**—In recent years, many attempts have been made to inhibit corrosion and to minimize deposits in oil-fired boilers, caused by the vanadium present in Bunker "C" fuel oils.

The use of fuel additives has proven beneficial toward minimizing this corrosion. R. S. Norris & Associates, Larchmont, N. Y., manufacturers of such additives, have entered the business of purchasing the ash deposits and slag which form on the boiler tubes and furnace floors of large central station and marine boilers. In some boilers of large central stations and certain ships of trans-Atlantic service, this molten slag has been known to build up on the furnace floor to a depth of 12 inches or more.

- ◆ **SOLID STATE INVERTER**—A laboratory development expected to have important effect upon application of new sources of electric power was recently disclosed by the General Electric Company.

The first working model yet announced of a high-capacity "solid state" electronic device for converting direct current to alternating current has been designed and tested. It has no moving parts, other than two fans, and it does the work of a 60-horsepower motor-generator set which is almost three times as heavy. Electric power generated by such means as fuel cells and solar energy is always in the form of direct current. Most applications, on the other hand, require that this be converted—and at low cost—into alternating current.

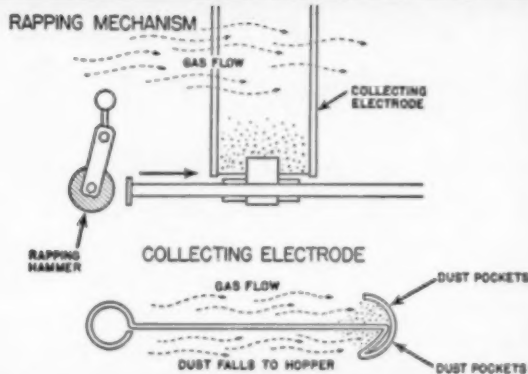
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# SOME PLAIN FACTS

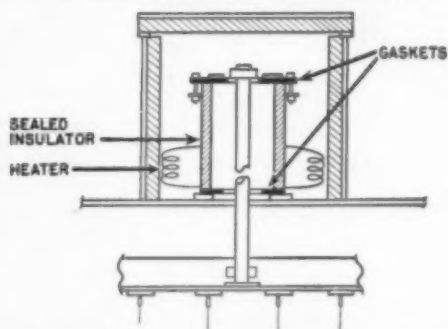
## ABOUT SUPERIOR PRECIPITATOR PERFORMANCE

Buell Precipitators are designed and constructed for rugged service and superior performance. Frills and internal trim-work of a doubtful value are eliminated in favor of strength and simplicity. The casing, outside supports, and internal parts are of rugged construction; and the four-point suspension of emitting electrodes ensures the greatest stability. Here are just a few of the outstanding features of Buell Precipitators.



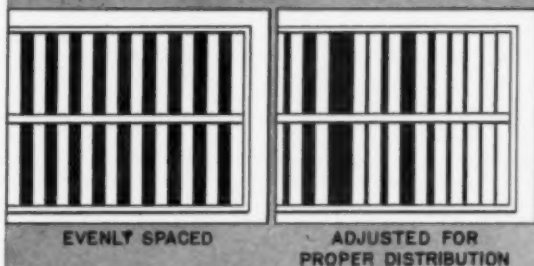
**Effective Continuous Cycle Rapping**—Yes, it's mechanical. A simple, rugged system free of complicated gadgets; assures positive dust shearing action. Each row of electrodes is rapped separately—in the direction of the gas flow—on a continuous cycle. Dust is sheared off, drops in an agglomerated mass and pockets on electrodes minimize reentrainment.

### SEALED INSULATOR COMPARTMENT



**Sealed Insulators Improves Operation**—High voltage quartz support insulators are completely sealed; prevents gas and dust leaking into insulator compartment and outside air leaking into precipitator. There is no need for costly ventilating systems. Thermostatically controlled electric heaters insure start-up without danger of moisture condensation and insulator breakdown.

### ADJUSTABLE BAFFLES



**Uniform Distribution of Gas Flow**—Field adjustment capability is vital. Buell's adjustable baffle permits final positioning after field measurement of actual flow distribution... because gas flow patterns are not entirely predictable. The Buell distribution system assures equal gas loading through the precipitator; eliminates ineffective "dead" areas around passages and prevents "sneak-by."



**Buell Spiralectrodes cut maintenance to a minimum.** Buell's record stands at less than 1% replacement in this key area. Self-tensioned spiralectrodes eliminate vibration and "off-center" swaying, often prevalent with weight-tensioned wires. They're structurally fixed and once installed stay in alignment. The spiralectrode provides greater emission than straight wires.

Buell precipitators are simple and effective. They're designed for continuous service. You'll be glad you turned to Buell when you experience superior performance and low maintenance. Detailed literature describing all features is available.



The Buell Engineering Co., Inc., Dept. 80-D, 123 William Street, New York 38, N. Y. Northern Blower Division, 6422 Barborton Avenue., Cleveland, Ohio.  
 ■ Electric Precipitators ■ Cyclones ■ Bag Collectors  
 ■ Combination Systems ■ Fans ■ Classifiers.



# Electrical Protection is *MODERNIZED* with BUSS fuses in the **KLM Royal Dutch Airlines** Building, New York City

## KLM INSTALLATION POINTS OUT THE NEED FOR SAFE INTERRUPTION OF HIGH FAULT CURRENTS

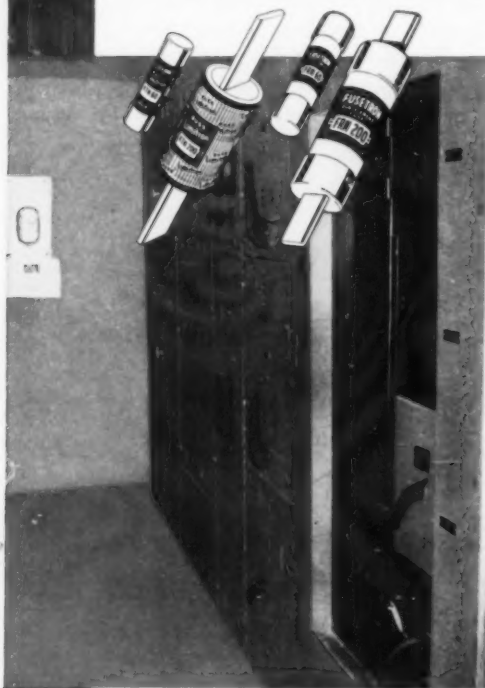
A 3 million dollar modernization program was recently completed on this 13 story office building at 609 Fifth Ave., which houses the American Executive and first floor ticket offices of KLM Royal Dutch Airlines.

To meet power requirements, the capacity of the electrical system was greatly increased,

resulting in an estimated available fault current level approaching 100,000 amperes.

In the main switchboard, Buss LIMITRON fuses are installed to provide the high interrupting capacity necessitated by the available fault current and to give great current limitation needed to protect circuits and equipment.

To further assure safe protection and to safeguard against needless outages, distribution and feeder circuits are equipped with FUSETRON dual-element fuses.



## *Fuses Offer the Safest, Most Practical Solution to Modern Protection Requirements*

As electrical network capacities increase, available fault currents of 75,000 to 100,000 amps and up are no longer uncommon.

In order to adequately safeguard circuits and equipment, it becomes imperative to install protective devices that can safely interrupt these fault currents.

### HIGH INTERRUPTING CAPACITY

Fuses provide high interrupting capacity at a very low cost. Buss LIMITRON fuses have an interrupting rating of 200,000 amps. rms symmetrical — and for FUSETRON dual-element fuses it is 100,000 amps.

### CURRENT LIMITATION

Buss LIMITRON fuses also provide current limitation so that fault currents are shut-off before equipment on the circuit can be damaged.

### LIFE-TIME DEPENDABILITY

Fuses remain safe and accurate through the years. Fuses have no triggers, latches, pivots or contacts to stick or get out of order. They require no expensive maintenance or recalibration — they are always ready to function the instant trouble occurs.

To help you select the proper fuse, write for the new BUSS booklet . . .  
**BASIC PROTECTION FOR ELECTRICAL POWER SYSTEMS.**

Part of Main Switchboard Protected by:  
3-3000 amp., 3-1200 amp., 6-1000 amp.,  
BUSS LIMITRON FUSES and  
15-400 amp., 3-350 amp., 3-275 amp.,  
3-250 amp., 9-200 amp., 3-125 amp.,  
3-90 amp.,  
FUSETRON dual-element FUSES

**BUSSMANN MFG. DIVISION McGraw-Edison Co.**  
University at Jefferson, St. Louis 7, Mo.



**Architect:**  
ANTONIO RAYMOND AND  
L. L. RADO,  
NEW YORK CITY, N. Y.  
WALTER HART, Co-ordinating  
Architect for KLM  
**Consulting Engineer:**  
EBNER ASSOCIATES,  
NEW YORK CITY, N. Y.  
**Electrical Contractor:**  
DAVIDSON ELECTRIC CO.,  
BROOKLYN, N. Y.  
**General Contractor:**  
TURNER CONSTRUCTION CO.,  
NEW YORK CITY, N. Y.

## **Facts and Trends (Continued)**

- ◆ **FIBERGLASS REINFORCED PLASTICS** — A 32-page illustrated booklet describing resins, reinforcements and releases used in laminating and casting includes technical data on contact and spray-up molding.

This brochure outlines properties and handling procedures for polyester, epoxy, and foam-in-place resins, and contains a 24 plate chart of color paste dispersions and list of technical reference books. Available to industrial users without charge. Request Catalog C on company letterhead. Allied Resin Products Corporation, Hingham Industrial Center, Hingham, Mass.

- ◆ **NEUTRON TELESCOPE** — A sensitive electronic device which permits nuclear engineers to "look" through the thick steel walls of an atomic reactor to see how much steam it is producing has been described by a top General Electric scientist.

The device, which is mounted above the core of the reactor, can be aimed accurately at a fuel channel from a distance of 20 feet and will count fast neutrons coming up out of that section. Since water acts as a block to the passage of fast neutrons, if the reactor is not producing a lot of steam bubbles the number of neutrons counted by the "neutron telescope" will be small.

Write the editors for additional information on any of the above items.  
SOUTHERN POWER & INDUSTRY, 1760 Peachtree Road, N. W., Atlanta 9, Ga.

..... REPRINTS AVAILABLE .....

Write the editors of SPI for small quantities of the following at no charge

- **SEGCO 1,000,000 KW PLANT**—A 16-page folder describing this large new Alabama plant, serving Alabama Power Co. and Georgia Power Co., is a combination of two technical articles from SPI's September and November issues.
- **HOW EPOXY CAN SERVE YOU**—4 pages. Tells exactly how 10 separate repair jobs were handled and describes several epoxy mixes that are good for maintenance jobs.
- **ORIFICE METER INSTALLATIONS**—Tells what the plant man needs to know about installation to get accurate, dependable service.
- **INSPECTION REPORTS**—Tells how the station chemist can maintain information on the condition of boilers, cooling towers, condensers, heat exchangers, tanks and softeners. Actual inspection sheets are presented.
- **ELECTRICAL DISTRIBUTION FOR LARGE PLANT**—An 8-page special report prepared jointly by Director of Facilities, the Consultants, and the Contractor — describing plans and installation of all electrical services for new plant of Texas Instruments Inc., Dallas, Texas.
- **THERMAL INSULATION DIRECTORY:**  
Tells where to get service and technical data.....6 pages
- **WATER TREATMENT DIRECTORY:**  
Tells where to get service and technical data.....12 pages
- **AIR & GAS CLEANING DIRECTORY:**  
Tells where to get service and technical data.....16 pages
- **COMBINED GAS-STEAM CYCLE PERFORMANCE:**  
First year report on new plant, West Texas Utilities Co..6 pages





Strength  
Economy  
Durability



## NEW FEATURES NEW ADVANTAGES

**...Now make Armco Steel  
Buildings an even better  
way for you to build**

Get complete facts about how the new Armco Building sizes, designs, and special features now solve almost any business building problem. You'll find handsome new flat-roof building designs, greater widths (up to 120 feet between supports), new heights, a classic new wall panel, new insulated interior wall for all-weather comfort. Use the handy coupon. Armco Drainage & Metal Products, Inc., P. O. Box 1343, Atlanta 1, Georgia.

**ARMCO DRAINAGE & METAL PRODUCTS, INC.**

Send details about the NEW LINE of Armco Steel Buildings. I am interested in a building for the following use:

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

New steels are  
born at  
Armco



**ARMCO Drainage & Metal Products**

**"When we put in  
the Payroll  
Savings Plan..."**



**"It fitted into our operation perfectly..."**

"I had an idea it might be a bit complicated to install the Payroll Savings Plan. Seeing all our people, explaining how it operates, pointing out its advantages. But the way it worked out it was simplicity itself.

"All we did was contact our State Savings Bonds Director. He outlined the campaign for us, working through the bond officer we appointed. A short, company-wide person-to-person canvass was set up—and the results were absolutely amazing. Some of our people told us later that since they found out how convenient it is to save *regularly* through the Payroll plan they have actually increased other investments, too!"

When your company has a flourishing Payroll Savings Plan for U.S. Savings Bonds, participating employees have the added satisfaction of helping to keep America strong.

For prompt, friendly help in setting up a Payroll Savings Plan in your organization, contact your State Savings Bonds Director. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D.C.

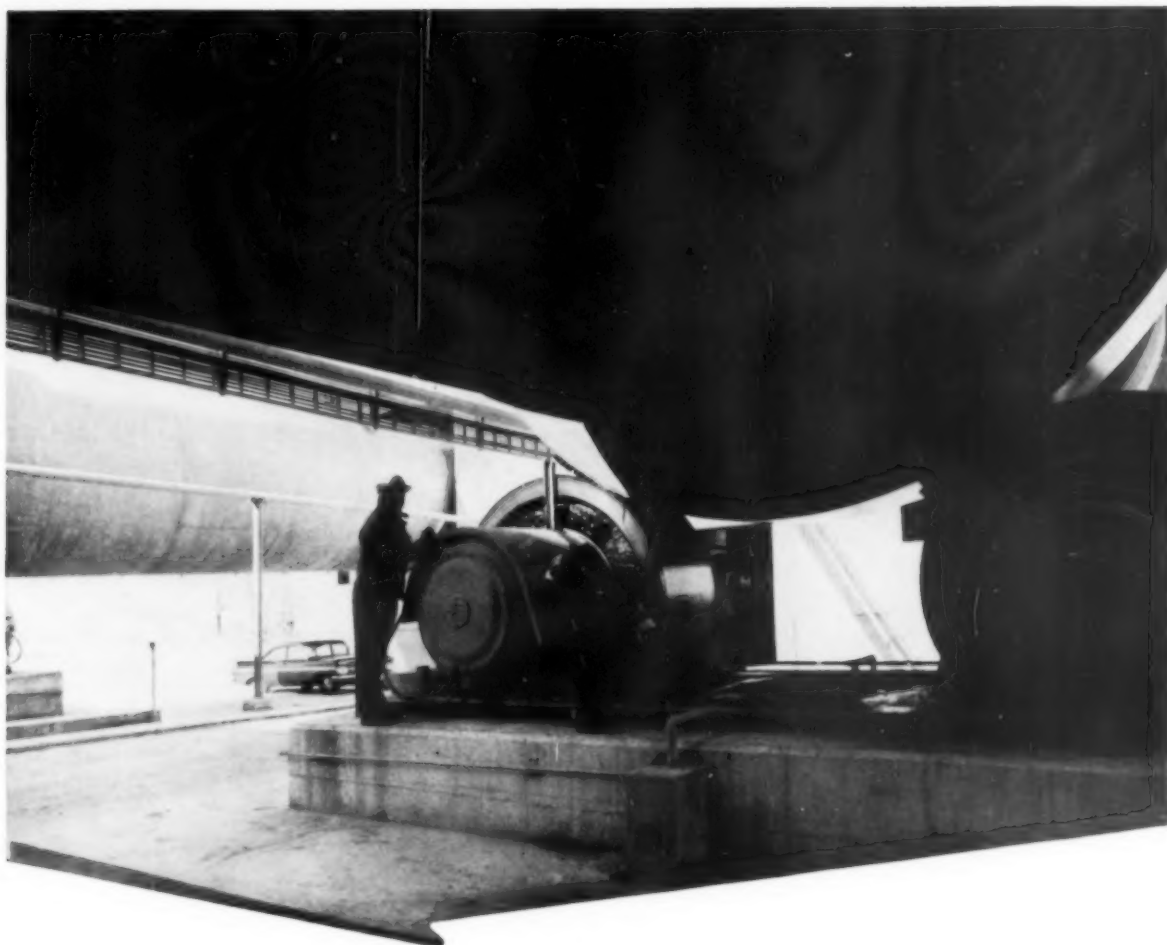


**ALL U.S. SAVINGS BONDS—OLD OR NEW—EARN  $\frac{1}{2}\%$  MORE THAN BEFORE**



**SOUTHERN POWER & INDUSTRY**

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.



## Here's a Dixie Bearings survey that is saving our customer "endless hours"\*

A letter from our customer, a cement company, tells the story far better than we ever could! We quote:

"Having received your manuals, which bear the results of your plant wide survey, it is my pleasure to offer the following comments.

"Needless to say, we feel you have performed a service, from which we will enjoy benefits for many years to come. The manual is the most comprehensive and complete compilation of important bearing and seal data I have ever seen. \*Endless hours of time will be saved in years to come by virtue of your application of our IBM numbers to the man-

ual and its simple cross-reference to the bearing identification. Having the book indexed to our flow system further simplifies its use.

"We recall the many days your men labored climbing over machinery, collecting information and the problems they encountered in obtaining all the bearing specifications.

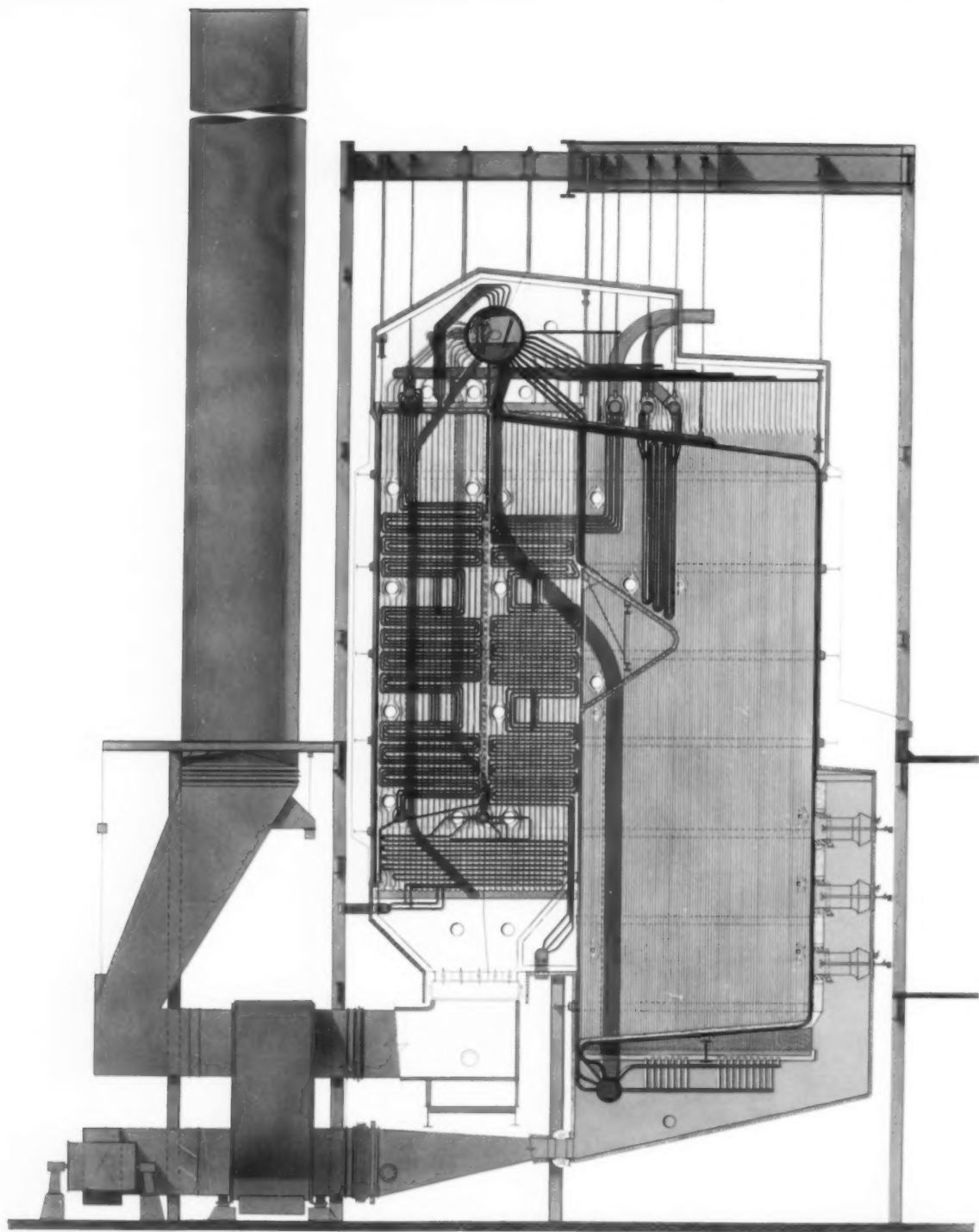
"Summing it up, we say — splendid job, and many thanks."

**THIS COULD HAPPEN TO YOU!** Call the branch nearest you and talk it over with one of our experienced bearing engineers.

*Providing bearing service  
in the South*

### **DIXIE BEARINGS, INC.**

**ARKANSAS:** Little Rock • **FLORIDA:** Jacksonville • **GEORGIA:** Atlanta • **KENTUCKY:** Louisville • **LOUISIANA:** Baton Rouge  
New Orleans • **N. CAROLINA:** Asheville • Charlotte • Greensboro • **S. CAROLINA:** Greenville • **TENNESSEE:** Chattanooga • Kingsport  
Knoxville • Memphis • Nashville • **VIRGINIA:** Norfolk • Richmond • Roanoke



*A careful survey of your plant  
by a qualified consulting engineer  
could show ways of making sub-  
stantial savings in power costs.*





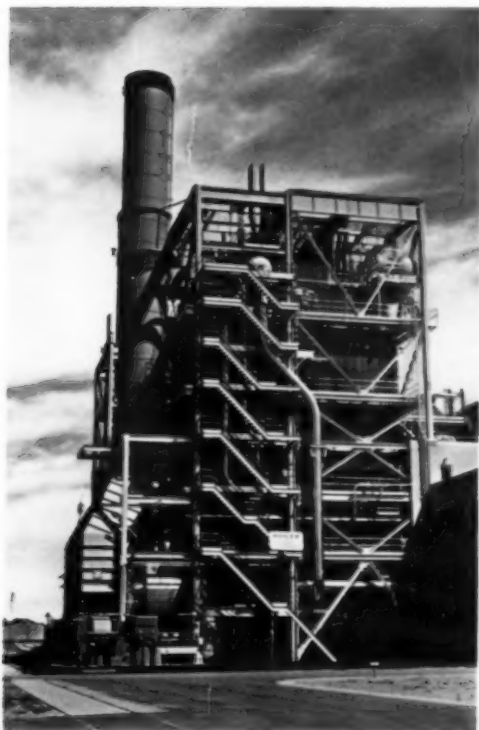
# Another **RILEY** Boiler in Texas Helps to Boost Productivity in the Lower Rio Grande Valley

**No. 2 Boiler**  
**J. L. Bates Power Station**  
**Central Power and Light Company**



Engineering Data  
Steam Capacity — 750,000 lbs./hr  
for 4 hours — 800,000 lbs./hr  
Design Pressure — 1750 psig  
Superheat — Reheat 1005/1005F  
Steam Temp. Control — Spray, Dampers  
Fuel — Gas and Oil  
Pressurized Setting  
Efficiency — 88.10%

Sargent & Lundy  
Consulting Engineers



During 1960 Central Power and Light Company, Corpus Christi based Texas utility, completed an extensive expansion program to its system with the installation of the No. 2 unit at J. L. Bates Power Station near Mission, Texas in the Rio Grande Valley. This unit adds 110,000 kilowatts to the system capability, bringing it to 953,000 kw — five times the capability of 10 years ago.

The Riley Reheat Boiler was selected as a result of a program designed to lower the cost of kilowatt production and to offset the increase in the cost of fuels.

Central Power and Light Company is one of several Texas utilities using Riley boilers. A total of over 16 million pounds of Riley steam has been purchased by utilities for Texas central stations since 1950, indicating the industry's remarkable growth, and increasing acceptance of Riley steam generating and fuel burning equipment.

#### RILEY UTILITY BOILERS IN TEXAS (Installed and on order)

HOUSTON LIGHTING & POWER CO.	11 Units — 6,440,000 lbs/hr
TEXAS ELECTRIC SERVICE CO.	4 Units — 5,861,000 lbs/hr
DALLAS POWER & LIGHT CO.	3 Units — 3,450,000 lbs/hr
CENTRAL POWER & LIGHT CO.	1 Unit — 725,000 lbs/hr
SOUTHWESTERN POWER CO.	1 Unit — 650,000 lbs/hr
SOUTHWESTERN PUBLIC SERVICE	1 Unit — 330,000 lbs/hr

## **RILEY**

**STEAM GENERATING & FUEL BURNING EQUIPMENT**

**RILEY STOKER CORPORATION, WORCESTER, MASSACHUSETTS.**

#### Sales Offices:

Boston, Charlotte, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, Jacksonville, Kansas City, Los Angeles, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Salt Lake City, San Francisco, St. Louis, St. Paul, Seattle, Syracuse.

1886-1961



## Thanks

*—to the three generations of customers whose confidence in the quality of Standard Oil industrial lubricants, and whose continued friendship and patronage have enabled these products to enjoy sales leadership for the seventy-five years we have served the South.*



STANDARD OIL COMPANY (KENTUCKY)



# the **SOUTH—SOUTHWEST**

**more power . . . more plants . . . more money**



## **J. J. Finnigan Co. — Atlanta Wins Safety Award**

At the 28th annual meeting of the Steel Plate Fabricators Association which was held in Fort Lauderdale, Florida on January 19th and 20th, 1961, **The J. J. Finnigan Company, Inc.**, of Atlanta, Georgia received the First Place award in Group C, Shop Fabrication conducted by the Safety Committee of the Steel Plate Fabricators Association in conjunction with the National Safety Council for no lost hours due to an accident or injury from October 1, 1959 through September 30, 1960.

Second Place winner was the American Bridge Division of the United States Steel Corporation, Orange, Texas plant and Third Place winner was the Birmingham Tank Company, Division of the Ingalls Iron Works, Birmingham, Alabama.

The award was made by Mr. Peter Gatte (left), Director of Safety of the General American Transportation Corporation of Chicago, to Mr. W. J. McAlpin, Jr. (right), Vice-President in charge of sales of the J. J. Finnigan Company, Inc.

J. J. Finnigan Company, Inc. was founded in Atlanta, Georgia in 1888

and for over 73 years has operated in the same location in Atlanta. The company has sales offices in leading cities throughout the U.S.A.

## **New Houston Plant for U. S. Industrial Chemicals**

National Distillers and Chemical Corporation will build a 60,000,000 pound-per-year linear polyethylene plant adjacent to its conventional polyethylene plant at Houston, Texas, according to an announcement by Dr. Robert E. Hulse, executive vice-president and general manager of the **U. S. Industrial Chemicals Co.** division.

The new plant, which will mark National's entry into the manufacture of linear polyethylene, is scheduled for completion in the fourth quarter of 1962. It will be managed and operated by the same people who are now running the company's low and medium density polyethylene plant at Houston.

The new linear polyethylene, to be manufactured under a licensing agreement with Phillips Petroleum Company, will be sold under U.S.I.'s brand name "Petrothene" polyethy-

lene. Linear polyethylene, which is stronger and more rigid than the conventional type, is widely used for the manufacture of blow molded bottles and containers for household staples and industrial products.

## **Layne Assoc. — Memphis**

**Layne Associates**, a new organization, with headquarters in Memphis, Tennessee, was recently formed to promote progress in the development and conservation of water supplies and to provide technical information through research in the field of water.

John M. Proos, executive secretary of the organization, is also Chairman of the Board of Directors of Layne & Bowler, Inc. Other newly appointed officials include P. O. Bourgeois, chairman, and Roy D. Woboril, vice-chairman.

## **Georgia Plant Makes Geodesic Dome Shelters**

**Filtered Rosin Products Company** of Baxley, Georgia, wholly-owned subsidiary of Monsanto's Organic Chemicals Division, is manufacturing a line of lightweight shelters featuring geodesic dome design.

Trademarked "Geospace," the domes are to be marketed initially as ready-to-assemble units of Fomecor board panels coated for weather resistance. They are glued together at the site to form the self-supporting geodesic dome 22 feet in diameter. Fomecor board is a foamed plastic and kraft paper laminated material fabricated by a subsidiary of Monsanto and St. Regis Paper Co.

The shelters are expected to have wide application including emergency housing in disaster areas and job-site warehousing for industry.

John S. Laws is vice-president and general manager of the Georgia plant. Personnel loaned to Filtered Rosin Products Company at Monsanto's St. Louis headquarters includes: Lloyd D. Shand, director of marketing for the Geospace project; Robert

H. Young of the manufacturing department, who will assist in production; and Bennett Shapiro, as director of design and development, with laboratory facilities in St. Louis County. Mr. Shapiro was formerly president of Geocentrics, Inc., of St. Louis, which was purchased by Monsanto. His company engaged in design and development of commercial geodesic domes.

## PLANT PERSONNEL

**Don Phillips** has been promoted to plant engineer at the Houston plant of National Supply Division, Armco Steel Corporation. Mr. Phillips started with the engineering department at Houston in 1957 and was later made assistant development engineer.

**J. B. Driscoll** will be manager of production for Electric Autolite Company's new Decatur, Alabama



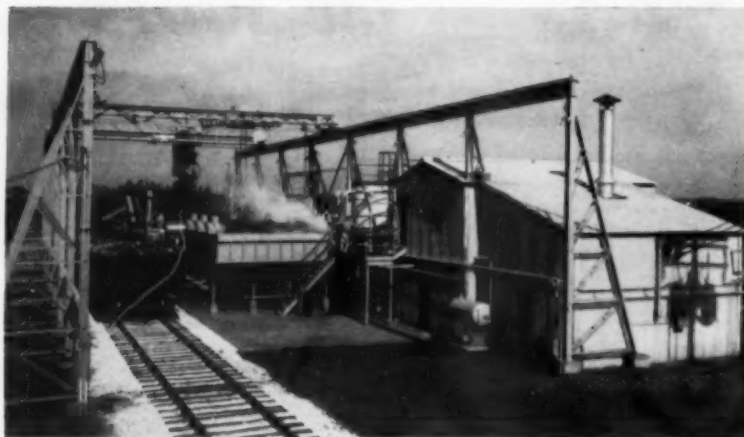
J. B. Driscoll



J. L. Gage

plant, where full operation is scheduled for July. Plant manager is **R. O. Boden**. **James L. Gage** has been named chief product engineer.

**George F. Herrmann, Jr.** has been appointed superintendent of Virginia Electric & Power Company's Chesterfield Power Station near Richmond, following the retirement of



## Metal & Thermit Opens Florida Detinning Plant

**Metal & Thermit Corporation** officially opened its new half-million dollar detinning plant in Tampa recently. The 11-acre plant site is in the Summit Corporation Industrial Park, on Route 301, just north of Route 60. Construction was begun last August.

The plant will use a modern chemical process to recover tin from tin plate scrap. Because the United

States is almost entirely dependent upon imports of tin to fill its needs, reclamation of this basic metal through detinning operations serves an important function for industry.

Metal & Thermit Corporation is a major supplier of industrial chemicals, coatings, minerals, welding equipment and electrodes. The company operates chemical plants in Carrollton, Ky., and other locations.

**Ralph C. Palmer**, **Elmo M. Sweeney, Jr.** replaces Mr. Herrmann as superintendent of the 12th Street Power Station.

**Fred G. Gronemeyer** has been promoted to the new position of vice-president and executive director of industrial development for The Chemstrand Corporation at Pensacola, Florida. **Louis E. Dequine, Jr.** succeeds Mr. Gronemeyer as director of nylon manufacturing. Before he joined Chemstrand in 1951, Mr. Dequine was chief engineer for the American Bemberg Division of Beaunit Corporation at Elizabethton, Tenn.

General manager of Metal & Thermit Corporation's Detinning Division, whose new Tampa, Florida, plant opened recently, is **J. K. Parks**, company vice-president. The Division also has a plant in Baltimore.

**Uriah M. Brist**, who joined American Viscose Corporation at Front Royal in 1940, has been appointed manufacturing superintendent of the company's Fredericksburg, Virginia cellophane plant. **Edward L. Woolley** is plant manager.

## New \$5 Million Airco Plant — Delaware

**Air Reduction Sales Company** recently announced plans for its first air separation plant to serve the petrochemical industry, to be built at a cost of \$5 million at Claymont, Delaware. Oxygen will be piped directly into the adjacent SunOlin Chemical Company ethylene oxide production facilities scheduled to go on stream late this year.

Total capacity of Airco's plant will be in excess of 350 tons of oxygen per day. Initially, about 120 tons per day will go to SunOlin and the remainder will be shared by other companies in the area. This arrangement represents an unusual concept in on-site industrial gas plants; the so-called on-site/off-site, or over-the-fence concept developed by Air Reduction. While most on-site air separation plants serve a single customer, and are often built on the customer's property, the over-the-fence plant is built adjacent to a principal customer's property and supplies the amounts of product over and above that produced for his



needs to other customers in the area. Primary advantages of this type of plant to the principal customer are that no capital investment is required of him, and because production is higher than the quantity of gas he requires, he can often obtain the product more economically.

### Daniel Construction Co. — Greenville, S. C.

Charles Daniel, Chairman of the Board, announced the appointment of Buck Mickel as Executive Vice-President of **Daniel Construction Company**, Greenville, S. C.

Mr. Mickel has been with the company fourteen years and served in the capacities of Field Engineer, Cost Engineer, Estimating and Project Manager.



Daniel Construction Company, the largest industrial general contracting firm in the country, during 1960 completed plants valued in excess of \$150,000,000.

### President of Tampa Electric Receives Award

W. C. MacInnes, president of **Tampa Electric Company**, was named the city's "Outstanding Citizen for 1960" at the annual Governor's luncheon in Tampa.

Business and political leaders from throughout Florida were present as Mr. MacInnes received the 32nd annual Civitan award, sponsored by the Florida State Fair and Gasparilla Association.

Since his arrival in Tampa only six years ago, Mr. MacInnes has taken part in many civic activities, including presidency of the Committee of 100, which brought millions of dollars worth of industry to Tampa.

### Electric Conference To Be Held at Mobile

The 12th Annual Rural Electric Generating Cooperative Conference is scheduled for May 1-4 at the Battle House Hotel in Mobile, Alabama.

An attendance of from 150 to 200 of the supervisory and engineering personnel of cooperatively owned steam and diesel generating plants from over the nation is anticipated. Top management of many electric generating cooperative associations will attend, and manufacturers of equipment for power plant construction and operation will be represented.

D. E. Smithson, Superintendent of McWilliams Power Plant at Andalusia, Alabama, is chairman of the program planning committee.

### 1961 Southern Metals Conference — Atlanta

The 1961 Southern Metals Conference will be held at the Atlanta Biltmore Hotel on April 24, 25, and 26. The meeting will be sponsored by the Atlanta Chapter of ASM, and Dr. Robert F. Hochman of the Chemical Engineering Department at Georgia Institute of Technology is Conference Chairman.

The program will include industrial sessions, study of research in metals and materials, Metallorama movies, and social events. Tours of the Georgia Tech Experiment Station, Lockheed, and Atlantic Steel have been planned. There will also be an exposition at the Biltmore.

## FUTURE EVENTS of Engineering Interest

**April 5-7: AIEE Southeast District Meeting**, Jung Hotel, New Orleans, La. Sec'y American Institute of Electrical Engineers, 33 West 39th St., New York 18, N. Y.

**April 10-13: ASME Oil & Gas Power Division Conference & Exhibit**, Jung Hotel, New Orleans, La. Edward L. Satola, Pub. Chm., Nordberg Mfg. Co., 3073 S. Chase Ave., Milwaukee 1, Wis.

**April 10-14: Annual Assembly, International Institute of Welding**, Sheraton-Atlantic Hotel, New York. (See AWS Apr. 17-21.)

**April 12-13: AIEE Materials Handling Conference**, Hotel Sheraton, Philadelphia, Pa. H. A. Zollinger, Chm. AIEE Materials Handling Subcommittee, Westinghouse Electric Corp., Pittsburgh, Pa.

**April 17-21: ASW 42nd Annual Meeting & Welding Show**, Commodore Hotel & New York Coliseum. Sec'y, American Welding Society, 33 W. 39th St., New York 18, N. Y.

**April 19-21: 7th Southeastern Regional Conference & Instrument Exhibit**, Instrument Society of America, Park Center & Public Library, Charlotte, N. C. Eugene B. Finch, Exhibit Chairman, Rt. 2 —Box 673C, Charlotte 9.

**April 20-21: Annual Meeting**, American Society for Engineering Edu-

cation, Oxford, Miss. Charles E. Gearing, Chm. RWI Membership Comm., S.E. Section ASEE, Dept. of Engineering Ext., Auburn University, Auburn, Ala.

**April 24-26: ASM 1961 Southern Metals Conference**, Atlanta Biltmore Hotel, Atlanta, Ga. Dr. Robt. F. Hochman, Chm., c/o Chem. Eng. Dept., Georgia Institute of Technology, Atlanta 13.

**April 28: Oklahoma Regional Meeting**, Natural Gasoline Assn. of America, Lake Murray Lodge, Ardmore, Okla. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

**May 1-4: Rural Electric Generating Cooperative Conference**, Battle House Hotel, Mobile, Ala. D. E. Smithson, Chm. Prog. Plan. Comm., Alabama Electric Coop., Inc., P. O. Drawer 551, Andalusia, Ala.

**May 19: Permian Basin Regional Meeting**, Natural Gasoline Assn. of America, The Lincoln Hotel, Odessa, Texas. Wm. F. Lowe, Exec. Dir., 421 Kennedy Bldg., Tulsa 3, Okla.

**Aug. 14-17: 9th Annual Short Course in Fundamentals of Occupational Safety**, Louisiana State University, Baton Rouge, La. Fred H. Fenn, Dean, College of Engineering.

## News of the South-Southwest — more power . . . more plants . . . more money

### A. Lynn Thomas — Va.

Richard M. Dillon, manager of the **A. Lynn Thomas Co., Inc.**, Norfolk branch since July 1958, and former Branch Manager at Raleigh, North Carolina, has been promoted to the post of Executive Vice-President and General Manager of the firm.



Mr. Dillon will be succeeded in the Norfolk position by Major L. Kight, Jr., who has been a salesman with the organization for the past six years.

The Thomas Company is a distributor and contractor for refractories, industrial and marine insulations and corrosion-resistant materials, and builds and repairs refractory settings for all types of industrial furnaces. Founded in 1894, the company maintains home offices and warehouse facilities in Richmond, with branches in Norfolk, Raleigh and Charlotte.

### Airco — St. Louis

J. P. Casalis, Jr. has been appointed district manager of **Air Reduction Sales Company** at St. Louis. Mr. Casalis is now responsible for the sale and distribution of all Airco products marketed through the facilities at 630 South Second St., St. Louis 2, Missouri. He succeeds W. M. Holley, who has resigned to become an Airco distributor.

### Clark Equipment — S.E.

The Industrial Truck Division of **Clark Equipment Company** has established a new sales and service outlet at 1111 Florence St., Jackson, Miss. George Elam is general manager, and Len Luft is parts and service manager. The branch serves Southern Mississippi.

Delta Materials Handling Inc., 185 E. Butler St., Memphis, Tenn., is

a new dealership formed after the retirement of Fred J. Vandemark, Clark's former dealer in that location. W. S. Sherman is president, and Vic Vandevor is vice-president and general manager. The dealership serves neighboring counties in Arkansas, Tennessee, and Mississippi.

### Cambridge Wire Cloth Opens Houston Warehouse

The **Cambridge Wire Cloth Company**, Cambridge, Maryland, has opened a warehouse at 7009 Long Drive, Houston 17, Texas, with Edward F. Pink as manager.

All of the most frequently used grades of wire cloth in standard metal-mesh sizes will be available for immediate shipment to users in the Southwestern area.

The Houston sales office, under the direction of Charles E. Shuman, will also be located at the warehouse.

### Typhoon Names District Managers

Newly named district managers for **Typhoon Air Conditioning Division**, Hupp Corporation, include the following:

Douglas G. Peltz, 7371 Overbrook Drive, St. Louis, will cover Missouri, Kansas, and part of Illinois.



G. F. Hafkemeyer

George F. Hafkemeyer, with an office in Houston, is Texas district manager. A mechanical engineering graduate of the University of Texas, Mr. Hafkemeyer was previously chief project engineer with Tifco Inter-America Corp., and also had been with United Gas Corp. at Houston for eight years.

Ralph E. Rivers, 421 Meadow Lane, Athens, Georgia, will cover the State of Georgia. Mr. Rivers, a graduate of Southern Technical Institute, was

previously an engineer with Dorsey Heating & Air Conditioning Co. at Athens.

### Steiner Co. — S.E.

Appointment of Charles A. Wallace, 2035 Bermuda St., Shreveport, La., as territory manager for wash-room dispensers and sanitary paper



products in Louisiana, Mississippi, Alabama, western Tennessee and western Florida is announced by **Steiner Company**, Chicago.

Before joining Steiner, Mr. Wallace was manager of a Shreveport paper firm. He is a graduate of the University of Mississippi.

### Atlas Valve Co. — Louisiana & Mississippi

**Atlas Valve Company**, 280 South Street, Newark 5, N. J., manufacturer of automatic pressure, temperature and level controls, has appointed Ray Moon, 1325 Audubon Avenue, Baton Rouge, Louisiana, as a sales representative.

Mr. Moon will represent Atlas throughout Louisiana and Mississippi.

### Ryerson — New Orleans

The appointment of H. R. Davies Sales and Engineering, New Orleans, La., as its sales agent in Southeast Louisiana and Southwest Mississippi, was announced by **Joseph T. Ryerson & Son, Inc.**, Houston, Texas, distributor of steel, aluminum, industrial plastics and metal fabricating machinery.

The Davies firm has been established since 1938, and is headed by H. R. Davies, Sr. A former vice-president of Ross-Meehan Foundries, Chattanooga, Tenn., Mr. Davies has been active in the field of engineering sales for 37 years.

## Green Fire Brick — Ala.

The A. P. Green Fire Brick Company of Mexico, Missouri, recently announced the appointment of Jack Q. Lewis as manager of its Birmingham Branch.

Mr. Lewis, a graduate mechanical engineer from the University of



Alabama, has been engaged in the manufacture and sale of refractory products for over 15 years.

He will continue active management of the company's subsidiary, Dixie Fire Brick Company. Prior to its merger with the Green Company in 1959, Dixie had been operated by Mr. Lewis and his brother, John W. Lewis, after the death of their father, who owned the company.

## Air Products Plant for Bethlehem Steel — Md.

A \$6 million oxygen-nitrogen producing plant is now under construction at Sparrows Point, Maryland by Air Products, Inc. When completed in mid-1961, the plant will supply 350 tons per day of high purity oxygen and 450 tons per day of high purity nitrogen to Bethlehem Steel's Sparrows Point Works.

The new plant, which is being built and will be owned and operated by Air Products, is adjacent to the Bethlehem Steel Works. The oxygen will be injected into the open hearth furnaces through roof lances. Production will be increased because oxygen speeds the removal of carbon and other impurities in the steelmaking process. The high purity nitrogen will be used for sheet steel annealing operations in the mill.

In 1948 Air Products installed the first of a number of on-site plants for Bethlehem Steel at its Sparrows Point Works. With later additions, production capacity reached 42 tons per day of oxygen in 1956. With the new plant, Bethlehem's oxygen capacity will be nine times greater.

## Fort Worth Steel & Mach'y — Kansas City

Fort Worth Steel & Machinery Company has announced the appointment of Wayne Doyle as district sales engineer, working out of the office at 2057 Holmes St., Kansas City, Mo.

Mr. Doyle, an industrial engineering graduate of Texas A & M College, was previously in the company's central engineering department at Fort Worth, Texas.

FWS&M manufactures and mar-

kets nationally the "Fort Worth" line of mechanical power transmission equipment and bulk materials handling equipment.

## Okonite — W. Va.

The Okonite Company, wire and cable manufacturing subsidiary of Kennecott Copper Corporation, announces that a new branch office has been established at 1799 Huber Road, Charleston, West Virginia. It is headed by John P. Oblinger, who formerly served the West Virginia area from Bluefield.

LOWEST COST OPERATION OIL... GAS... OIL & GAS



## TODD "SAV-PAC"

### FORCED DRAFT—REGISTER TYPE PACKAGED BURNER SYSTEM

FULLY AUTOMATIC OR SEMI-AUTOMATIC . . . this high efficiency system is manufactured in a wide variety of sizes and models, arranged for firing steam boilers and high temperature hot water generators of all types up to the equivalent of 100,000 lbs. of steam per hour. Available with axial flow blowers or centrifugal blowers fitted with electric motor or steam turbine drive as required.

"SAV-PAC" is built for trouble-free performance, extra economy using all grades of fuel oils, gaseous fuels or combinations of both. Self-contained unit includes register-type burner, forced draft fan, air-fuel controls, wiring and piping in separate enclosed panels, mounted complete.

Also available TODD ROTO-PAC fully automatic forced draft rotary burner systems.

Write for complete details and specifications

## TODD SHIPYARDS CORPORATION

PRODUCTS DIVISION

Sales and Service Departments: Columbia and Halleck Sts., Brooklyn 31, N. Y.  
Plant and Sales: P. O. Box 9666, Houston, Texas

# INDUSTRY SPEAKS



## Pioneers for the New Frontier

Abstracted from an address by Secretary of Commerce LUTHER H. HODGES before the Associated General Contractors of America, Inc.

**IF THE NATION'S** economic recovery and growth are to be energetically advanced, what will be the nature of the Governmental actions needed, and what role will the business community play in advancing these goals both in its own interests and those of the nation?

I am not asserting that we face today an immediate shortage of capacity, but I do believe we face a shortage of that kind of efficient physical plant which would make it possible to produce more economically and to perform the research which leads to the production of more new products — thus broadening the scope of both our domestic and foreign markets, and making our products and services more competitive.

Although we compete with lower wage scales elsewhere, it seems to me also that more modern production facilities, more efficient labor practices, better planning, more aggressive salesmanship — in short, greater productivity, superior research efforts, and more initiative have enabled foreign producers to outdo us in many areas of legitimate business competition.

I want to emphasize that a lot of talk and grumbling will not solve problems — we need to “dig” for business. We in the Government are taking some practical steps. By way of example, we are taking a new hard look at our tax laws and I am hopeful we can do something along this line. Without discussing specific proposals, if you will permit this generality, I will say that we must make our tax laws the instrument of incentive rather than an alibi for indifference. We need provisions bearing on depreciation allowances to stimulate rather than retard the investment decisions of industry.

This Administration believes in fiscal responsibility and balanced budgets. But human wants and national needs are paramount. If necessary to spur recovery, I believe and I know my colleagues believe, that the Fed-

eral Budget can be used effectively to help, not hinder, our forward progress.

No short-range measures can substitute for a long term effort to promote economic growth by fostering private investment, by maximizing our use of natural resources and the further development of energy sources, and finally by strengthening and utilizing to the full our human resources through broad advances in the fields of education and health, as well as through scientific and technological gains.

Underlying all our programs and proposals for their implementation must be stress and concern for achieving greater productivity and price stability. President Kennedy's recently announced Labor-Management Advisory Committee provides a vehicle for moving forward towards these objectives. The Committee is composed of a membership from labor, management, and the public.

I have no doubt that in the final analysis the broad economic advances, which we must achieve to nurture our profit motivated economy, depends not only on scientific breakthroughs, but also on our development of sound wage and price policies and a mutual understanding of economic problems by government, industry and labor.

The major responsibility of private industry is to avail itself of every profitable worldwide opportunity to invest, produce, sell, and grow. We in the Department of Commerce have no pat formulas to offer you to accomplish any of these, but we offer valuable tools for your use. We have an abundance of statistical information which makes us the leading fact-finding organization in the world.

I suggest you examine closely any wasteful practices which impair productivity and retard progress. I suggest you not hide from technological advances in the unfounded fear that they may crimp your profits, but welcome and utilize them in the interests of improving the quality and value of your work. Admittedly, you have many obstacles to surmount, but as a major industry, you have the stuff to be pioneers for the New Frontier.



Delivers soft water by the simplest and most dependable method of softening water—the zeolite softener.



Delivers high quality  $\text{CO}_2$  and silica free deionized water. Used to treat water of relatively low alkalinity.



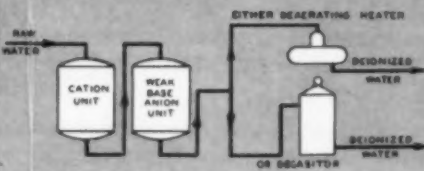
Delivers deionized water low in dissolved solids—suitable for many boiler and process applications.



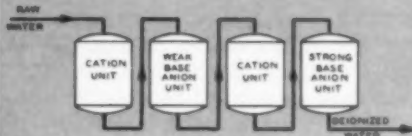
Delivers deionized water, free of  $\text{CO}_2$  and silica. Very effectively used for waters of high alkalinity.



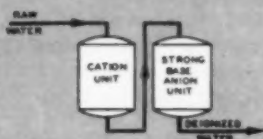
Delivers deionized water and eliminates  $\text{CO}_2$  with either degasating heater or degasitor.



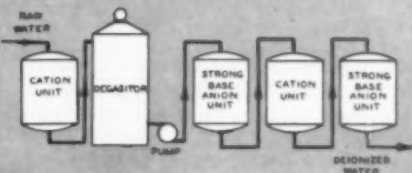
Delivers exceptionally high quality deionized water, free from silica and  $\text{CO}_2$ . Effectively used on waters of low alkalinity.



Delivers deionized water free from silica and  $\text{CO}_2$ . Used largely for waters of low alkalinity.



Delivers highest quality deionized water, free from silica and  $\text{CO}_2$ . Last two columns provide the "polishing" steps.



Delivers deionized water free from silica and  $\text{CO}_2$ . Usually built in large sizes for low cost  $\text{CO}_2$  removal.



Delivers deionized water of highest known quality—free from silica and  $\text{CO}_2$ . Used alone and as "polishing" unit.



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Some of the modern methods we are using today are diagrammed above . . . and there are many combinations of these dictated by the variables in water supply and final use.

But whether your requirements can be met by a simple zeolite water softener—or whether you need the most highly "polished" water—this much is certain: The best and most economical solution to your problem must come from a firm like Elgin that offers every modern and authoritative approach.

Write for the Guide to Better Water Treatment—Bulletin 615

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# TIMELY COMMENTS

## Better Employee Health Insurance

**ARTHUR H. MOTLEY**, President of the Chamber of Commerce of the United States, speaking at a luncheon meeting of the Health Insurance Association of America, called for a three-point program by the insurance companies to improve health insurance for the aged.

1—Package pensions and life and health insurance together in order to reduce premiums paid by employers and employees.

2—Set up health insurance plans (along the lines of some life insurance plans) that employees can fully pay up during working years before retirement.

3—Help businesses make their group health insurance plans available to all of their retired employees.

Mr. Motley also urged support for the medical aid program passed last summer by Congress.

He summed up the responsibilities of the insurance industry, the medical profession, and the business community this way:

Every individual should have the right to choose how he will spend his own money, and this right should be vigorously defended. As to insurance, he should have the right to decide whether or not to purchase insurance or to use other means of protecting himself against the hazards of sickness.

Employers have a great responsibility for making voluntary health insurance available to their employees and their dependents under a group insurance program.

Hospital, surgical, medical expense coverage has become almost a "must" in any well-rounded employer-employee group insurance program.

Catastrophe coverage is now generally recognized as an essential part of any well-rounded group insur-

ance program, and employers quite generally are including it as part of their employee group insurance programs.

Employers have been quick to recognize the value of making group health insurance protection available to retired employees and their dependents.

The National Chamber has strongly recommended the idea. The response to the Chamber's appeal has indicated a widespread interest. It showed that many of the more progressive employers had already taken advantage of this opportunity. Many others were interested and studying it.

A few employers have assumed the entire cost of this additional protection. Some have shared the cost with their retired employees and, in other cases, the coverage has been made available under the group program but the cost paid by the retired employees.

It seems to me that some way must be found whereby the cost of this post-retirement health insurance can be paid for during the working years of the employee so that after retirement he is entirely free from this burden.

Pension plans and group life insurance were common benefit programs even before health insurance came along. Why shouldn't it be possible to offer these three closely related, and highly essential, forms of employee protection in a single package at a reduced cost?

I've heard a great deal in recent years about the combining of life insurance companies with property and casualty insurance companies and about some of the package policies which have been developed. Why wouldn't it be equally feasible to combine pensions, group life insurance, and group health insurance into a single package, cut the sales cost, the cost of administering it, and reduce the premium paid by the employer and the employee?

ONE OF A SERIES OF CHATS ABOUT  
CONSERVATION AND CONTROL OF HEAT

# SARCO TOPICS

## SO YOU THINK YOU'VE GOT TEMPERATURE CONTROL PROBLEMS

When plant men get together and talk about their temperature control problems, strong men may weep. It's so darned basic—that narrow range of degrees which must be maintained—so closely allied to profit and loss. Let us tell you about one situation that may even top yours, and may clue you in on a good solution. It concerns wine, of all things.

Take those basic temperatures. Wine must be pasteurized at 140°F. Those are the facts of life in the world of wine. They might not seem too difficult to live with unless you are concerned with heat. Then you probably know how tough things can get when you have a rendezvous with a thermometer.

Take New York's Monarch Wine Company, producers of Manischewitz Wines. Their Problem: how to maintain the 140° temperature in the heat exchangers despite wide variations in the rate of wine flow. These variations, between 5 to 60 gallons per minute, result from slowdowns and recoveries in the bottling process. Problem: entire system must be capable of complete shutdown when necessary. Problem: wine temperatures must be raised to 140° as rapidly as possible, sometimes an immediate jump of 100°.

Attracted perhaps by aspects of the situation that had little to do with pure science, Sarco engineers applied the collective experience of Sarco technology to the solution

of this serious problem. The result for Monarch: the *degree of control* the process demanded—achieved through the excellent use of Sarco Temperature-Pressure Regulators, Float Thermostatic Steam Traps, Thermo-Dynamic Steam Traps, and Pipeline Strainers.

Sarco engineers, ever resourceful, divided each of the two large Cherry-Burrell plate-type heat exchanger units into two separate



sections with a blank baffle plate, each with a separate Sarco control. Thermal sensing bulbs were installed in wine discharge and throttling controls hooked into steam supply. As demand fluctuates, one or both regulators function to maintain the 140° temperature. In higher demand, both regulators are operative; as demand drops and flow decreases, only one regulator supplies steam. Pasteur himself would have been elated.

Each of six smaller capacity shell-and-tube heat exchangers required only one regulator, with the sensing bulb inserted into the outlet side of the wine filled shell, and the regulator throttling steam supply to the tube section. Thus, by controlling flow of steam to the exchangers on the basis of pressure and temperature, the Sarco regulators were able to maintain the temperature of the wine at precisely 140° regardless of fluctuations in demand or supply rate. Whew! A lot of engineering went into those two sentences.

From here on it's downhill. To secure complete cut off of the steam supply during scheduled shutdowns of the bottling run, solenoid valves were provided to supplement normal modulating action of the controls. To discharge widely varying loads of condensate continuously and remove immediately all air and incondensable gases, Sarco Float Thermostatic Steam Traps were installed on all condensate outlets. On the drips before each control valve a Sarco Thermo-Dynamic Steam Trap was installed to insure delivery of dry steam. Sarco

Pipeline Strainers were installed before all steam traps and valves to protect them against damage by any foreign bodies. And thus ends a classic story of the grape.

Still, this story has been condensed far too much, really, and we feel you've been cheated out of the story's more delicious details. You needn't be, however. We've printed the facts in detail for posterity and you in Sarco Case History 185, complete with drawings that practically make it a do-it-yourself kit. If you would like a copy, we will be flattered to receive your request, and dispatch it with dispatch.

## WE'RE ALWAYS IN ... AND THE WELCOME MAT'S OUT

We always take it for granted that if you are going to be in the vicinity of our plant you'll phone or drop us a line so we can invite you to visit us. You'll find that our factory in Bethlehem, Pennsylvania, is on many well-travelled routes, and that our steam laboratory has much to offer in interest and helpfulness. Forgive us for being immodest, but the lab is the most up-to-date of its kind in the country.



When you visit us, don't allow yourself to get sidetracked by the drill presses and automatic lathes. We're proud of this equipment but you've probably seen metal mutilated before, and it's our steam laboratory that's unique. We promise you a good show, and if you have any problems, bring them along. We'll solve them while you wait.

## ANYONE FOR KEY CHAINS?

Need a key chain? A tiny replica of a Sarco Thermo-Dynamic Steam Trap, Type TD-50 is attached but you can always remove it if you find it too commercial. There are many things you could use these chains for. Fishing sinkers? Lengthening a light cord? Even holding keys? Anyway, if your Sarco representative is out, write in.

Pardon our monopolizing the conversation in this series of paid communiques, but we're trying our best to interest you in certain subjects that concern us both—to the point where you'll communicate.

6355

# SARCO

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635 MADISON AVENUE, NEW YORK 22, N. Y.  
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STEAM TRAPS • TEMPERATURE CONTROLLERS  
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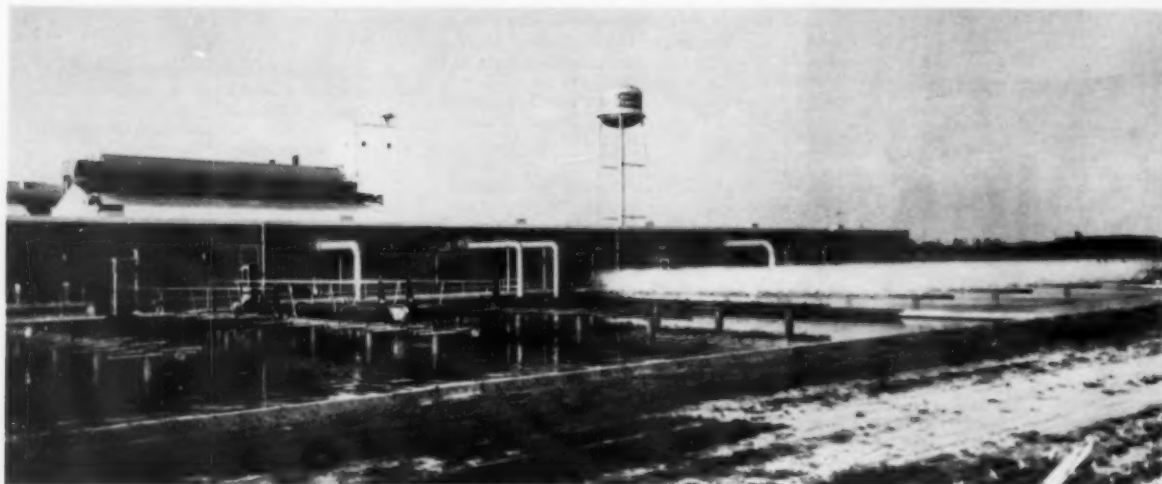


Fig. 1. A spray pond adjoining the plant cools water for the air conditioning system.

### **Owner, Engineer and Contractor**

### **Teamed-Up to Construct Multi-Million Dollar Plant in South Carolina**

## **Fourteen Months Saved by Planning**

**THE NEW 900,000 SQ FT** Owens-Corning Fiberglas plant now in production in Aiken, South Carolina, was constructed on a schedule that brought it into initial production in less than five months after the first foundations were poured — less than seven months from ground breaking and only a year after initial site selection studies started.

The Owens-Corning Fiberglas plant at Aiken is devoted to production of glass fiber products for textile uses and plastic reinforcement. The plant includes complete processing, fabrication and warehouse installations, as well as all necessary utilities, employee service facilities, and offices.

The new Fiberglas plant is unusual in that it is a *direct mill*. Conventional mills melt down glass marbles, shipped from outside, to form the basic molten glass mixture which is then drawn through platinum bushings to form individual fiber bundles.

At the Aiken plant, *South Carolina kaolin*, *North Carolina sand*,

and *Georgia limestone* are batch-mixed and directly converted to melted glass for drawing into filaments.

#### **Construction Materials**

The mill utilizes Fiberglas products extensively in both exterior and interior construction. Standard steel sectional framing and bar joists are topped with rigid Fiberglas panels over which are cast-in-place gypsum roof decks, block-type Fiberglas insulation and built-up tar and gravel roof.

#### **Plant Services**

During construction the warehouse space was completed first to

provide work area for the air conditioning shop, electrical shops, sheet metal shop, fabrication shops, piping and machine shops. In this way the contractor was able to save several months' time in completing the plant.

A spray pond cools water for the entire plant air conditioning system (Fig. 1). Main water and waste lines serving the plant are brought in at grade level (Fig. 5) and distributed through piping in access tunnels located below the plant. Extensive piping and heavy duty pumps recirculate the water to the compressor rooms, also located in the access tunnels.

The heat transfer equipment and blowers are mounted in specially built arched penthouses mounted on the roof. A total of five of these provides complete air conditioning for the 900,000 square foot plant.

Construction also included a complete water treatment plant



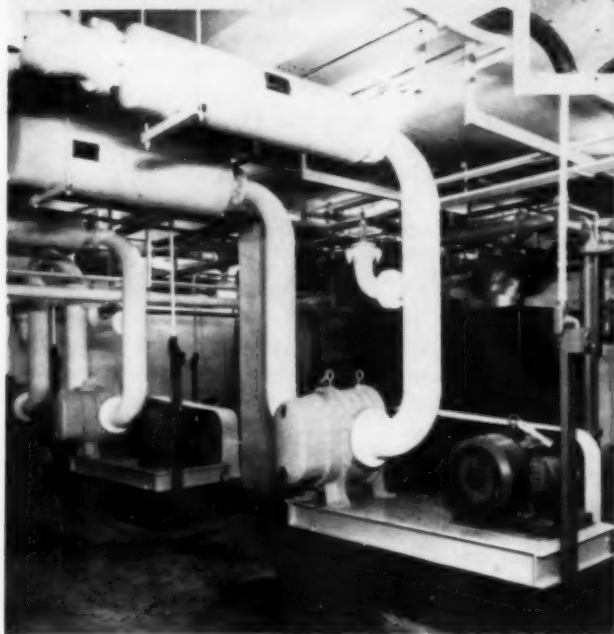
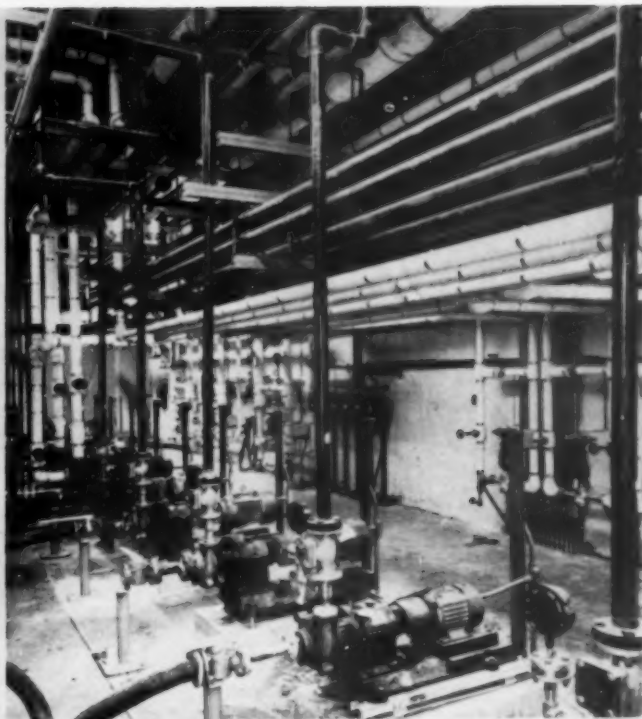
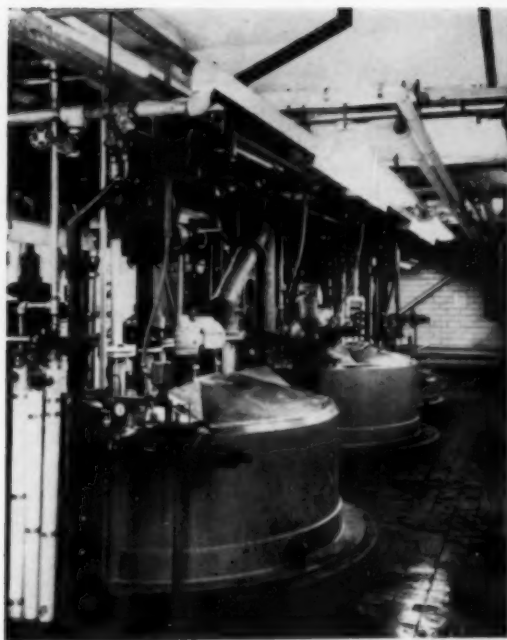


Fig. 2. Upper Left — Batches of binder (an adhesive coating) are mixed in these tanks.

Fig. 4. Lower Left — Multistage compressors in the basement provide instrument air.

Fig. 3. Upper Right — Metering pumps regulate flow of ingredients to batching plant.

Fig. 5. Lower Right — Main water and waste lines enter the plant at grade level.

and industrial waste disposal system of sufficient capacity to serve a city of more than 300,000 people.

Handling throughout the production process is by automatic conveyors. Overhead monorail systems

are used most extensively, and material movement is largely by automatic control (Fig. 6, 7, & 8).

Multi-stage compressors provide instrument air (Fig. 4), and metering pumps automatically regulate

flow of ingredients to the batching plant (Fig. 3).

Not only was the plant constructed with remarkable speed in order to accomplish the "operating in five months" record, but costs

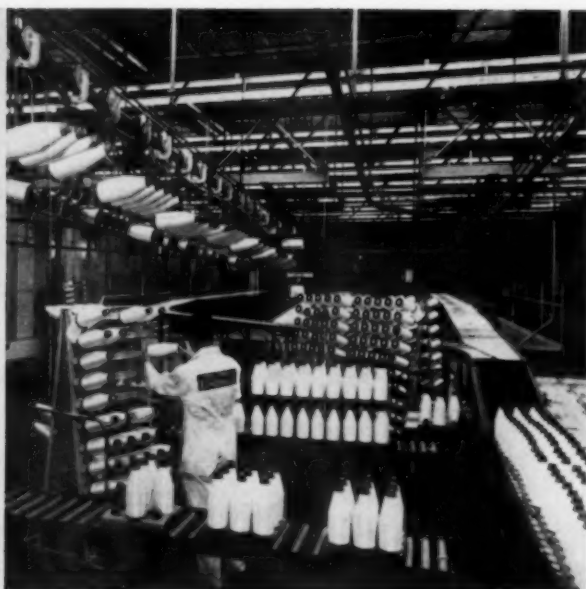


Fig. 6. Above Left — Automatic switching of overhead conveyors brings filled original drawing bobbins from forming ovens to twisting frames.

Fig. 7. Above Right — Overhead conveyor brings finished cones of Fiberglas yarn to final inspecting and packaging area.

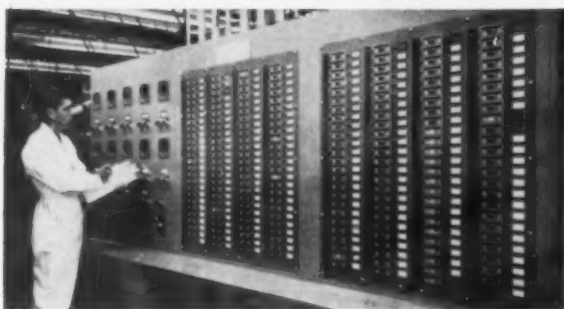


Fig. 8. Centralized control panel for overhead conveyor systems.

were held down. There were almost no charges incurred through delay or inefficiencies.

What made this unusually rapid, economical construction of a major project possible?

#### Management Techniques

A study of the construction management techniques may shed important light that will help others on the management of comparable projects.

Primarily two management decisions were responsible:

1. Place authority to control costs at the point where money is spent.

2. Keep overhead costs low through efforts of well-paid, top-level plant management and construction men working on the job at all times.

A three-element team put together by the owner (Owens-Corning Fiberglas), the general

contractor (Daniel Construction Company), and the engineer (Bechtel Inc.), was located right at the job site permitting on-the-spot decisions in design details, as well as ordering and construction techniques that made possible the tremendous speed of construction . . . even with plans that had not been completely detailed.

#### Delays Prevented

The tripartite construction management team on the Aiken project held down cost and prevented delays in many ways. Scheduling was planned in such a way that the production facilities were brought to completion in sequence so that the plant was in profitable production even before office and service facilities were complete.

On-the-job fabrication facilities were set up to prevent delays that might otherwise have been expected. Air conditioning ducts, sheet metal, light structural steel railing,

and process and steam piping were all fabricated on the job.

Even a central mix concrete batching plant, complete with ready-mix trucks, was provided on the site when it became apparent that all local plants put together could not supply the need for 4,000 yards per week.

Anticipating the steel strike, "the team" performed advance analyses of framing, roof deck and structural steel systems to arrive at the most available and least expensive alternative. As a result, an order for 60 per cent of the required steel was placed before drawings were completed.

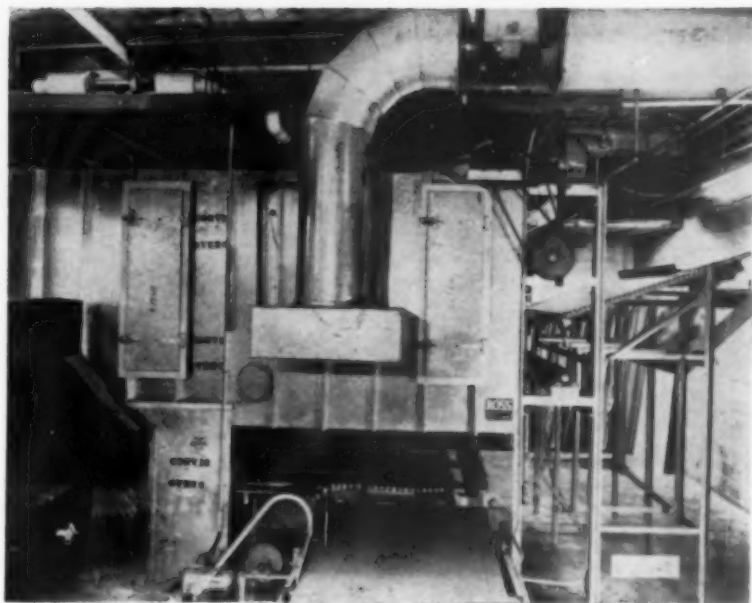
#### 30% Saved

Total construction savings in dollars effected by the tripartite management teamwork approach is estimated at 30 per cent. Total time saved in getting the plant into production is estimated at fourteen months.

Fans "Blow Hot and Cold" to Speed Processing — Orangeburg, S. C.

## Combination Heating and Cooling Oven

One end of Ross triple-deck combination oven-and-cooling tunnel at U. S. Plywood plant. Shown here is panel being transferred from top to middle section by hinged platform which swings downward to re-direct panel. Also shown is right-angle transfer at tunnel exit. Black insulated ducting to left is part of refrigeration system which cools panels for immediate sanding.



**A NEW** triple-deck combination oven-and-cooling tunnel at the United States Plywood Corporation, Orangeburg, S. C., dries finished plywood panels and then cools them for immediate sanding. The oven utilizes counterflow and high-velocity air drying, and the cooling tunnel employs both fans and refrigeration for cooling.

Custom-engineered transfer mechanisms at oven-and-cooling tunnel terminals direct panels to succeeding stages. The dual-purpose facility was designed and manufactured by the J. O. Ross Engineering Division of the Midland-Ross Corporation as part of an overall automated plywood finishing line engineered by the company.

The 75'-long multi-pass installation saves approximately 1,500 sq ft of floor space by making use of overhead space which would otherwise be wasted. Panels enter the oven at the upper level after receiving their final lacquer coatings. They travel through the oven

against a counterflow of air at temperatures up to 200 F, and emerge at the far end onto a skate-wheel platform. This platform then swings downward because of the weight of the panel, and directs the panel into the center compartment, through which it again travels against a counterflow of air at temperatures up to 200 F.

Part-way through the middle section, the panels enter the high-velocity zone. Here air up to 325 F is directed against them at velocities up to 4,000'/min. The air is impinged against the panels through nozzle outlets in the bottoms of closely spaced transverse ducts located above the traveling panels.

This high-velocity stage completes the final drying phase in a fraction of the time required with counterflow drying, and hence requires less space and equipment and increases productivity in comparison with previous drying methods.

The U. S. Plywood high-velocity oven accomplishes in 1½ min what

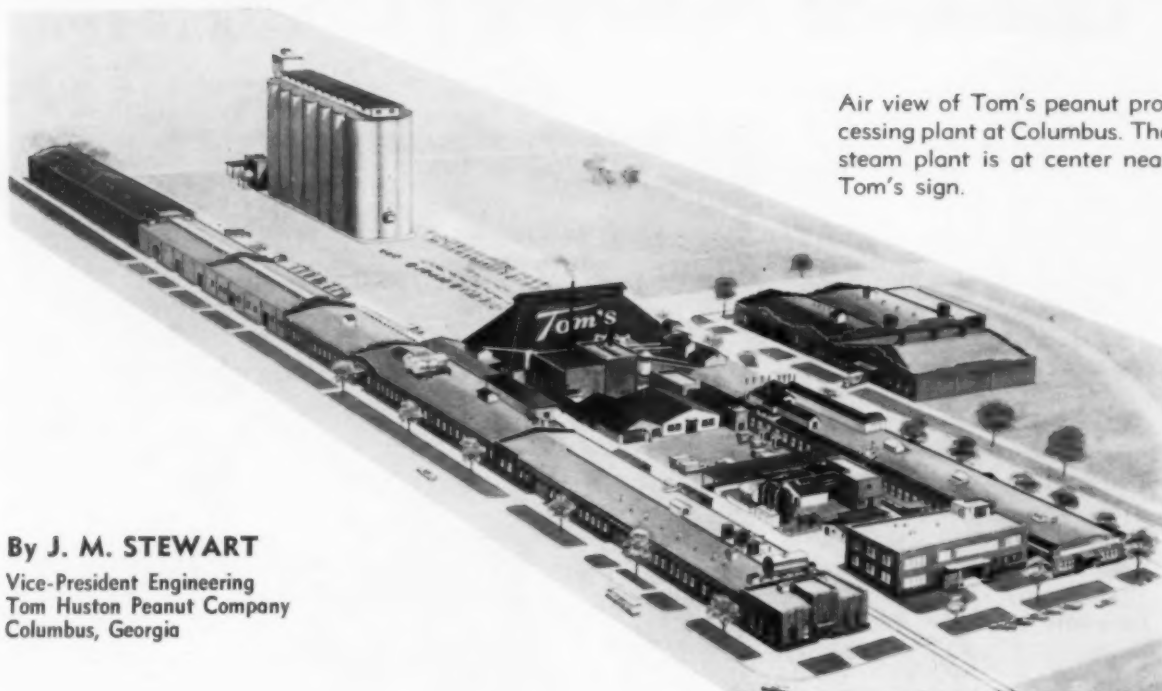
would require 6 or 7 min in a conventional counterflow installation. The slower-drying method is required in the preliminary drying stages, however, to assure thorough evaporation of innermost solvents before setting of the outer lacquer surface.

The dried panels transfer from the center section to the lower cooling level by means of a second hinged drop-transfer, and pass before a battery of fans which circulate room air over them. In the summer this air is exhausted to atmosphere. In the winter, all or part of it is recirculated into the room.

Following the initial cooling stage, the panels enter a refrigerated tunnel in which they are brought down to room temperature.

Upon leaving the refrigerated tunnel, the panels emerge onto a section of skate wheel conveyor which retracts upon receiving the full panel, and deposits it on a right-angle chain-conveyor which takes it to the sanding operation.

## Not "Just Peanuts" — Columbus, Georgia, Plant Uses Hulls for Fuel



Air view of Tom's peanut processing plant at Columbus. The steam plant is at center near Tom's sign.

By J. M. STEWART

Vice-President Engineering  
Tom Huston Peanut Company  
Columbus, Georgia

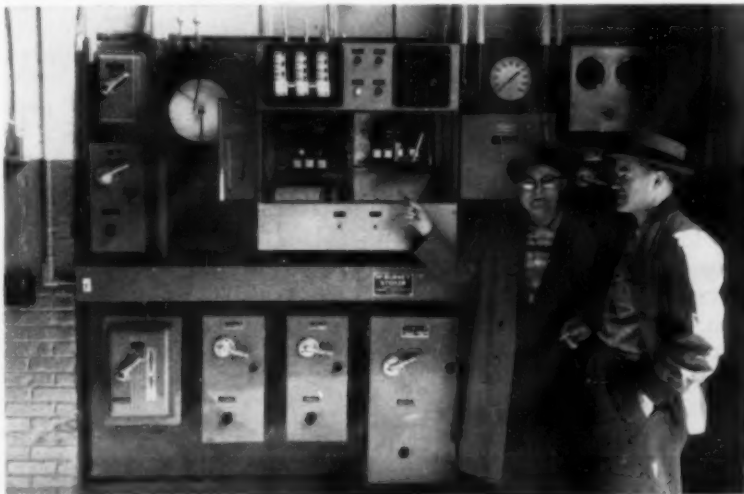
## Versatile Waste-Fuel Boiler

**THE TOM HUSTON** Peanut Company of Columbus, Georgia, has grown rapidly during the past several years. It became a \$25,000,000 business in 1960.

Naturally, the volume of peanuts processed through the Columbus plant has grown along with sales. At the present time the plant processes over 34,700,000,000 peanuts each year. Shells or hulls constitute approximately 20 to 25 per cent of the weight of peanuts as delivered from growers. This amounts to more than 7,000,000 pounds of hulls per year, which we must dispose of in some manner.

Until recently, the hulls were disposed of in three different ways, none of which was entirely satisfactory. Some were burned in two old fire-tube boilers, some were pulverized and sold to be used as a filler material, and the remainder were

The author (left) is discussing the control panel with Jim Roberson, the B&W representative.

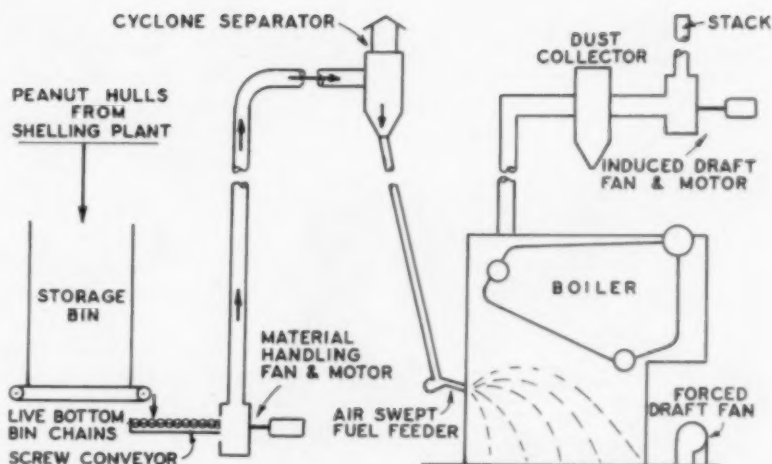




RIGHT — Sketch showing arrangement of boiler and fuel handling equipment.

CENTER — Front of boiler, showing hull feeders and pneumatically operated door for receiving plant waste.

LOWER — Side of boiler, showing ample space for operation and maintenance.



hauled off or given away. Since the combined capacity of the two fire-tube boilers was only about 7,000 pounds of steam per hour, it was necessary also to operate our B&W gas fired package boiler to provide sufficient steam for the winter load of approximately 16,000 pounds per hour.

Because disposal of the peanut hulls had become a problem, and since we had sufficient hulls to produce considerably more steam, we decided to remove our old fire-tube boilers and replace them with one modern water-tube boiler. The new boiler will burn all of our peanut hulls automatically and produce enough steam to carry the entire winter load.

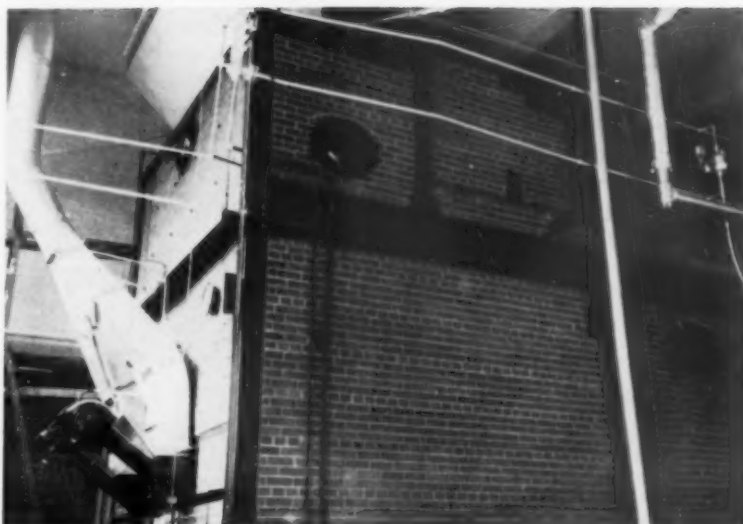
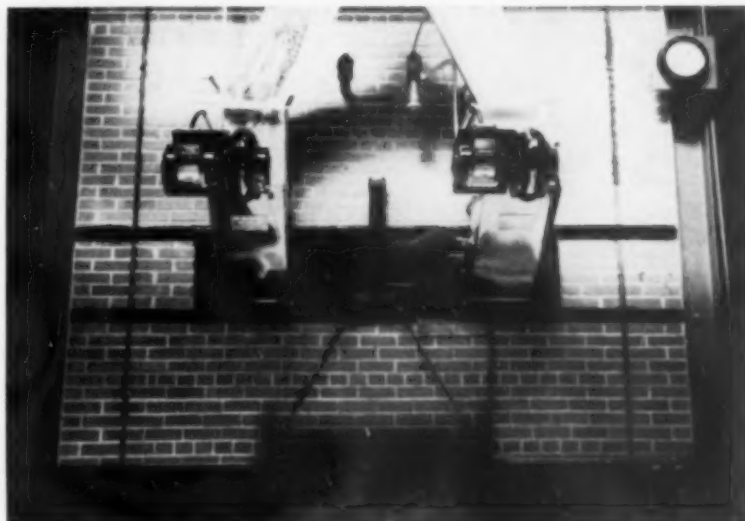
We decided that 22,000 pounds per hour peak capacity would be the best choice for the new unit. This is large enough to provide for future expansion and matches the 22,000 pound capacity of the existing gas-fired package boiler. The new B&W three-drum Stirling unit is designed for 200 pounds pressure, but operates at 120 psi, saturated.

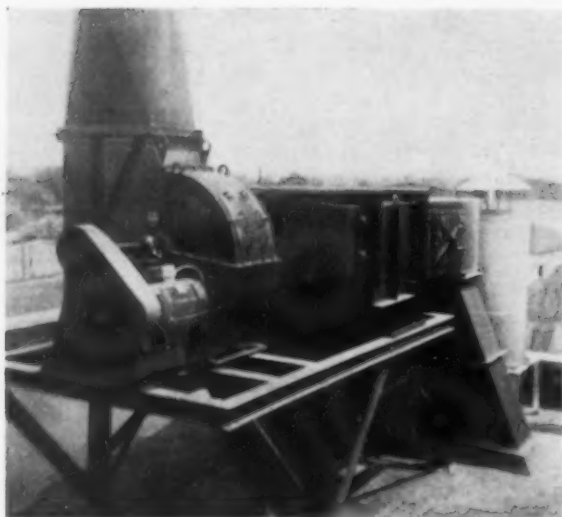
McBurney Stoker and Equipment Company of Atlanta supplied all firing equipment and served as contractor to make the complete boiler installation.

#### New Installation

With our new firing equipment installation the peanut hulls are fed as before directly into the storage bin from the shelling plant (see sketch). The bin has a capacity of approximately 20,000 cu ft or 75 tons of peanut hulls.

The live bottom floor of the bin is composed of 10 H-type conveyor chains in two sets of five chains each. Each set of five conveyors is





View showing induced draft fan and fly ash collector on roof. The cyclone separator for hulls is visible at far right.

## PRINCIPAL EQUIPMENT

Boiler .....	The Babcock & Wilcox Co.
Firing Equipment .....	McBurney Stoker & Equipment Co.
Combustion Controls .....	Cleveland Controls Inc.
Forced Draft Fan .....	Fly Ash Arrestor Corp.
Forced Draft Fan Motor .....	Westinghouse Electric Corp.
Induced Draft Fan & Stack .....	Fly Ash Arrestor Corp.
Induced Draft Fan Motor .....	Westinghouse Electric Corp.
Dust Collector .....	Fly Ash Arrestor Corp.
Live Bottom Bin .....	McBurney Stoker & Equipment Co.
Material Handling Fan .....	Clarage Fan Co.
Material Handling Fan Motor .....	Westinghouse Electric Corp.
Boiler Setting .....	McBurney Stoker & Equipment Co.

powered by a 4-speed transmission, which in turn is driven by a 7½ horsepower motor with variable speed drive actuated from the combustion control system.

By sloping the front and rear walls of the fuel bin, we were able to install the live bottom conveying equipment without modification to the existing building walls. The actual live bottom surface measures approximately 27 ft long and 18 ft wide.

The heavy duty chain conveyors empty the hulls into a collection screw conveyor, which feeds the suction of a material handling fan. The fan blows the hulls upward into a cyclone separator mounted on top of the boiler house. The hulls fall by gravity from the cyclone into two air swept fuel feeders which distribute the hulls evenly in the boiler furnace.

The boiler is mounted so that the center of the mud drum is 10 ft above the operating floor. This provides sufficient combustion volume to properly burn the fuel and keep refractory maintenance to a minimum.

The hulls are very dry, consequently most of them burn in suspension with only a small portion of the heavier matter falling to the grates. Proximate analysis of the peanut hulls (dry basis) is: Volatile matter 77.7%, fixed carbon 19.1%, ash 3.2%, sulfur 0.2%, and Btu per pound 8620. Total moisture as fired averages about 8.6%.

A large forced draft fan located at the rear of the boiler provides combustion air through the grates

as well as over-fire air in the furnace to insure good smokeless combustion.

### Fly Ash Collector

An efficient fly ash collector of the multi-cyclone design was installed to avoid objectionable dust and fly ash discharging from the stack. This is particularly important, because in our food processing operations complete sanitation is essential.

An induced draft fan maintains adequate draft in the furnace at all times, regardless of load, and is regulated by the furnace pressure controller in the combustion control system. All ash accumulating in the fly ash collector hopper is continuously reinjected into the boiler furnace.

### Combustion Control

Our combustion control system is electrically operated. It is a fully modulating design that varies fuel and air input to the boiler in proportion to steam demand. Since there are two independent drive systems on the live bottom bin we have a most flexible fuel feeding arrangement that permits the boiler to carry full load with only half of the conveyors in operation, if necessary.

The boiler is properly protected against low water with dual controls, alarm lights and horns, as well as fuel cut-offs. Feedwater input to the boiler is automatically controlled to hold a steady water level in the drum.

During the course of each day

we accumulate approximately 6,000 pounds of wax paper, wrapping paper, cardboard boxes and assorted trash, which is all burned in the boiler. This waste material is hand-fed without difficulty, as it is accumulated. Two large pneumatically operated doors opening directly into the furnace are provided for this purpose.

### Flexibility

Even though we have a 22,000 pound per hour Babcock & Wilcox gas fired package boiler, which is now on standby service, provisions were made in the new installation for hand firing of coal, in the event that both our peanut hulls and natural gas supply should be curtailed for some reason.

Peanut hulls tend to mat and pack together and consequently are extremely difficult to handle. That is the reason we felt that the expense of installing a live bottom feeding system was justified in order to insure automatic handling with subsequent labor savings. The even movement of hulls by the live bottom feeders also helps maintain an even and continuous steam supply for our process requirements.

### Results

We believe that we now have the best installation in the country for the handling of waste fuel to produce steam in the 20,000 to 25,000 pounds per hour range. We consider our new installation a sound investment. It is operating satisfactorily and we expect it to pay for itself within three to four years.

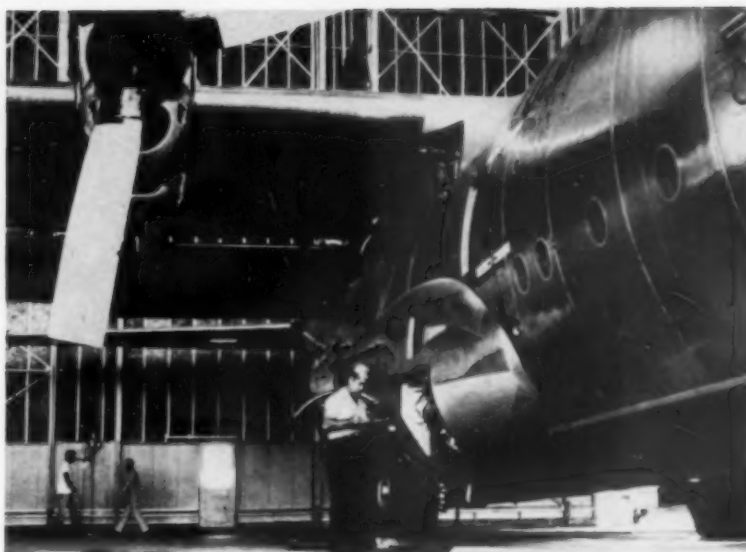
# Punched Cards for Quality Control

**A QUALITY CONTROL** program, based on the Keysort notched-card data processing system, helped reduce rejects, rework and scrap by as much as 50 per cent at the Lockheed Aircraft plant in Marietta, Georgia, after only 16 weeks of operation.

The results of the system — results which can mean thousands of dollars in savings over the course of a year — can be attributed primarily to a single factor: From start to finish there is only one document in the system. One four-part form, filled in at the point of inspection, is sufficient to control repairs, inform interested departments, and through edge-notching, set up the data necessary for analysis — all this from one simple original record, which requires no additional investment in specialized personnel or equipment to process. This Keysort system was developed by the Data Processing Division of Royal McBee Corporation.

In practice, the analysis feature of the system stands out as the most important gain. The Keysort statistical copy of the quality control set enables management to pinpoint exactly where, what, why and when rejection occurred.

The benefits of the system became evident almost immediately. Weekly reports derived from the cards verified that discrepancies were not uniformly distributed, but tended to fall within a few categories. The reports vividly brought out the fact that 51 per cent of all discrepancies fell in only 9 per cent of the quality characteristics reported. In addition, it was discovered that two out of 24 work positions accounted for 60 per cent of all discrepancies written, while two systems of the aircraft accounted for over 70 per cent of the total discrepancies.



The new quality control system at Lockheed, which has helped reduce rejections and rework by as much as 50 per cent, begins at the inspection station. Noting any faults, the inspector records what he finds on a four-part Royal McBee Keysort form — one form for each rejection.

These facts were not necessarily startling or new to the quality control people. However, this was the first time they had figures to back up their observations. Locating troublesome areas and specific problems led in part to the 50 per cent saving in rejects, rework and scrap.

## Procedures

If a flaw is detected at any point of manufacture, it is recorded on a four-part Quality Control Deficiency Record. The form is so designed that the inspector enters only the minimum amount of information — yet enough to show exactly what, where and when the discrepancy occurred. For example, in a box marked "Aircraft Area" the inspector enters a code number which tells what part of the aircraft has the deficiency. In a box next to that, marked "Systems," he enters a code which tells where within the area the flaw is located.

The Keysort multiple-part set is actually the focal point of the entire quality control reporting system. It is not only the fundamental record from which quality control reporting originates, but from which analyses are made and management decisions reached. This form remains in the aircraft's control book until the condition

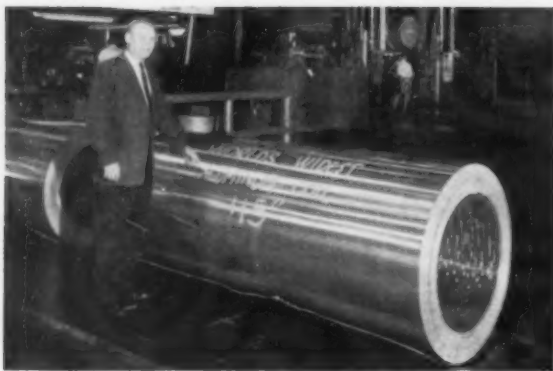
reported has been resolved or corrected.

Once that has been done, the form is marked "C. A." (corrective action), the detailed information as to what it took to fix the discrepancy noted, and the time (man-hours) written into boxes preprinted on the form. In addition, there are provisions for recording of information pertaining to "Buy Back" (re-acceptance after repair) by the inspectors.

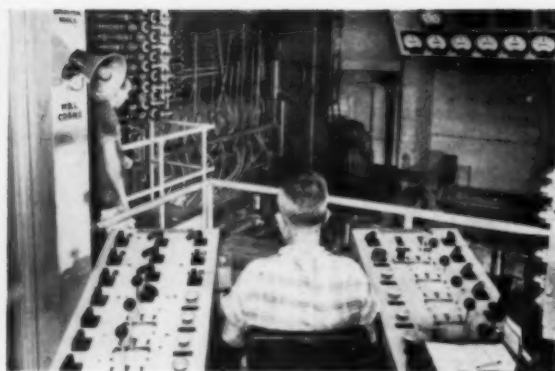
By writing one discrepancy per card, the form can be given intact to the department foreman for use as his production copy. This saves time and paperwork, and increases accuracy. Once corrective action has been completed, the four-part stub blocked set is separated, with one copy going to the organization responsible for the deficiency, one for the inspecting department, one for the aircraft's records, and one statistical copy to Quality Control.

## Reports

Periodically, cards are tabulated by aircraft area, by work position and by organization responsible. Unit Analysis reports are compiled which provide a graphic comparative trend picture of what, when, where and how discrepancies occurred for various periods.



D. H. Hipp, manager of the Reynolds Plant at Sheffield, Ala. with the "World's Widest" aluminum coils coming down the conveyor.



Somewhat like a jet plane's cockpit is the operator's control panel on the big aluminum rolling mill.

## **Reynolds Metals Company Alloys Plant Expanded — Sheffield, Alabama**

# **New Hot Line for Wide Sheet & Plate**

**THE WORLD'S WIDEST** aluminum coiled sheet and plate now is being mass produced on a complete new "hot line" in the Reynolds Metals Company Alloys Plant at Sheffield, Ala.

"This new line is part of our continuing program to bring the advantages of greater strip and plate widths, larger coils and mass production techniques to our customers," said W. M. Wells, vice-president, operations.

Both the 170-inch wide reversing mill which heads the new line and the four-stand 120-inch continuous strip mill at the other end are the widest aluminum rolling mills in the world, according to D. H. Hipp, plant manager.

"Between the 170-inch and the 120-inch mills is a 130-inch-wide reversing mill for increased production efficiency," Mr. Hipp said.

The 170-inch mill can produce plate up to 165 inches wide and the 120-inch strip mill can produce coils up to 115 inches wide before trimming, he said.

The plant has a 112-inch cold mill for further rolling of wide coils off the "hot line" where customer needs require.

The new "hot line" — so called because it rolls heated aluminum — is capable of producing coils weighing up to 30,000 pounds and almost seven feet in diameter to meet the growing fabricator demand for larger coils.

The three mills were built by United Engineering Company of Pittsburgh to specifications by the Reynolds production and engineering staffs.

David P. Reynolds, executive vice-president of the Richmond, Va., based aluminum company, said: "These new mills and their related equipment put our company in the lead in meeting a growing customer demand for wider sheet and plate.

"In today's highly competitive market we expect the potential customer savings in reduced welding or fastening requirements to create a strong demand for sheet and plate from this new 'hot-line.'"

Mr. Reynolds mentioned such already established uses of aluminum as railroad freight cars, ships, military vehicles, tanks for liquids which attack other metals, "fishy-back" and "piggy-back" containers

for cargo shipments and the "tremendous" market in trailers and truck bodies.

G. L. Simms, general manufacturing manager for sheet products, said the new "hot line" and related equipment were major parts of a three-year expansion program now nearing completion at the Alloys Plant.

### **300,000 Tons a Year**

Giant soaking pits, three big new batteries of reheating or annealing furnaces, one of the largest scalpers in the industry and a variety of new sheet-finishing equipment are part of the multi-million dollar expansion program.

This expansion, Mr. Simms said, makes the Alloys Plant the largest Reynolds rolling and fabricating plant with an annual production capacity of some 300,000 tons.

Products at the Alloys Plant include sheet, plate, structural shapes, rod, wire, bar, cable, welded tubing, nails, slugs and blanks.

The new "hot line" is about three average city blocks long. The 170-inch mill is higher than a three story building.

Electric motors used to drive the



giant mills and related equipment range from 7,000 horsepower for the big motor-generator set on the 170-inch mill to one-sixth horsepower for small oil filter systems.

#### Electric Power

Direct current is used to drive the mills for greater flexibility and the generators used to produce the necessary current range up to 3,100 kilowatts.

Total horsepower of all the 751 a-c and d-c motors used on the new "hot line" is more than 100,000.

In normal operation the "hot line" uses 11,000,000 kilowatt hours per month or about the same as 13,000 average homes.

The "hot line" is designed to handle a big ingot every two minutes. Aluminum sheet comes out of the last stand or set of rolls on the four-stand mill at more than 1,000 feet per minute at full speed.

New buildings to house the mill portion of the "hot line" along with the soaking pits, intermediate annealing reheat furnaces, scalper building and roll shop are covered with more than 890,000 square feet of aluminum siding and roofing and have more than 20 acres under roof.

The world's largest overhead aluminum crane with 150 tons rated capacity is used to handle the heavy mill rolls on the new "hot line."



A wide slab of gleaming hot aluminum rumbles through the 170-inch rolls of the new mill.

The world's largest aluminum rolling mills are located in the long aluminum-clad building in the foreground of this aerial view of the Reynolds Metals Company Alloys Plant at Sheffield, Alabama.



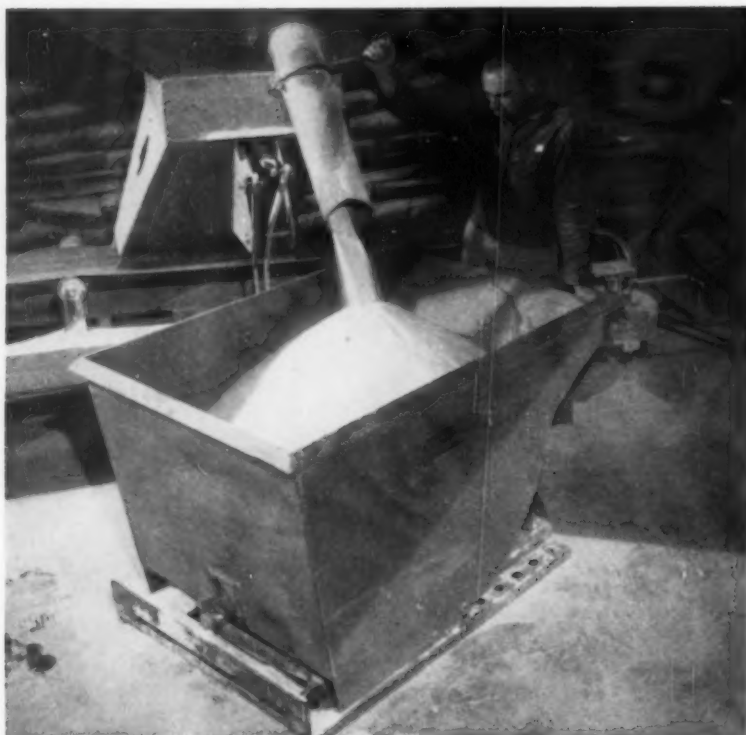


Fig. 1. Finely sized crushed marble used as a filler in vinyl floor tile is loaded into hopper for delivery to boxcar or truck. Latch on rear of unit is tripped by fork truck operator to permit hopper to dump contents.

## **Georgia Marble Company Solves Bulk Shipping Problem**

# **Cars Loaded by Self-Dumping Hoppers**

**WHEN A PLANT** is geared up to manufacture and ship a variety of bagged products, an occasional order for a bulk shipment can present handling problems. The Calcium Products Division of Georgia Marble Company, Tate, Ga., manufacturer of 41 different kinds of crushed and ground marble products, faced such a problem.

The cost of installing a bulk handling system to service infrequent orders for bulk boxcar or truck shipments was prohibitive. Still, when these orders were received, they had to be handled as fast and economically as possible.

After analyzing their bulk handling problem, plant personnel decided that self-dumping hoppers could be used to handle these

shipments and, when not needed for this purpose, could replace wheelbarrows for hauling plant waste.

The company purchased five hoppers of one-yard capacity, manufactured by Roura Iron Works, Inc. One of these hoppers was placed in use at each of five semi-independent plants which make up the Tate operations of the Calcium Products Division.

In four of the five plants, hoppers are handled by fork trucks. One plant uses a hydraulic platform truck to handle a hopper mounted on platform skid.

Here is how the hoppers fit into the bulk handling operations.

A boxcar or truck is spotted alongside loading dock at one of

the plants to receive a bulk shipment. Fork truck positions hopper beneath discharge chute of storage bin or places it next to a valve type bag packer.

Hopper is filled with approximately 2,400 pounds of material and the fork truck picks up the loaded hopper and transports it up to 40 yards to waiting boxcar or truck. Fork truck operator flips release handle on rear of hopper to automatically dump load. Hopper rights and locks itself, ready to be returned to reloading point.

When hoppers are not handling bulk materials, they are used for plant housekeeping jobs. During routine plant clean-ups, hoppers are positioned by fork truck so crews can shovel waste directly

Fig. 2. Roura hoppers of one-yard capacity hold about 2,400 pounds of marble products and are correct size for easy positioning under discharge outlet of valve type bag packing machine.



Fig. 3. Hoppers are mounted on skids for handling by fork truck. Filled hopper of marble roofing chips is delivered to boxcar for bulk shipment.



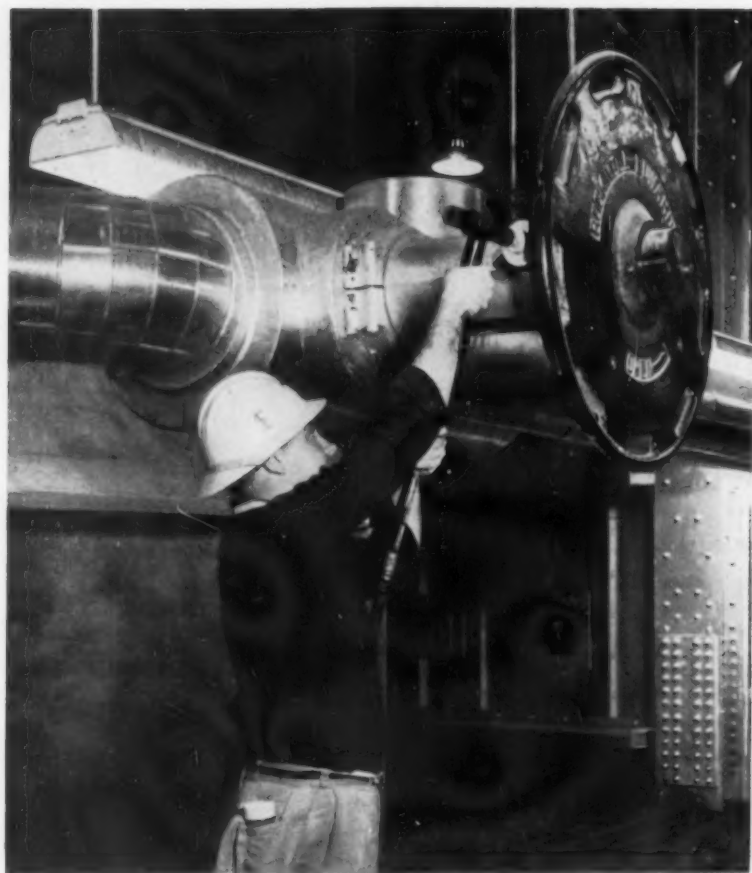
Fig. 4. Hopper empties roofing chips into customer's truck. Fork truck operator has tripped release latch on rear of hopper, permitting it to dump. Roura hopper will automatically right itself and lock into upright position ready for return to loading point.



into them. When hopper is filled, fork truck delivers it to a dump truck. In cases of minor spillage, hopper can be delivered to affected area by fork truck so spillage can be quickly shoveled into hopper.

Since the hoppers are designed to be handled by mechanized equipment, and because they dump automatically, the truck operator is the only man required for the handling operation. Once the Roura hoppers were placed in use, their cost was quickly amortized because of a ten per cent reduction in labor costs in this operation, according to production personnel.

Another advantage of the hoppers is their positive dumping action which empties them completely and prevents one product from contaminating a second one. Prevention of product contamination is an important consideration when many grades and sizes of materials which have to meet rigid quality specifications must be handled in the same hoppers.



That is not a hammer in the man's hand, it is air power. Hammer blows for final seating of the valve are provided by the big handwheel.

Edward Impactogear-equipped 8-inch globe stop valve on economizer inlet line. Valve is followed by an 8-inch tilting disk check valve.

## ***Portable Unit Saves Time & Manpower in Alabama Power Company Steam Plant***

# **Big Valve Operators**

**THE FIRST UTILITY** in the country to completely equip the main boiler feedwater valving for an entire generating unit with the new Impactogear valve operator is Alabama Power Company. The installation is on the company's No. 3 generating unit at its Barry Steam Plant, near Mobile.

The new gear arrangement driven by a portable power unit permits one man to run large high-pressure valves open or closed in minutes where a crew of two to five men otherwise would be necessary. This advantage becomes increasingly important as power plants become more automatic and have fewer operating personnel on each shift.

Twenty Impactogear-equipped cast steel globe valves are in the main feedwater piping of Barry No. 3. The two main feedline stop valves are 14-inch globe type, operate at 2400 psi, 340 F. Eight 10-inch globe valves are used as feedwater heater isolation stop valves at 2470 psi and 465 F. Two 8-inch stop valves control economizer inlet lines at 2400 psi and 450 F. Eight 10-inch stop-check valves are used on the controlled circulation pumps at 2300 psi, 615 F.

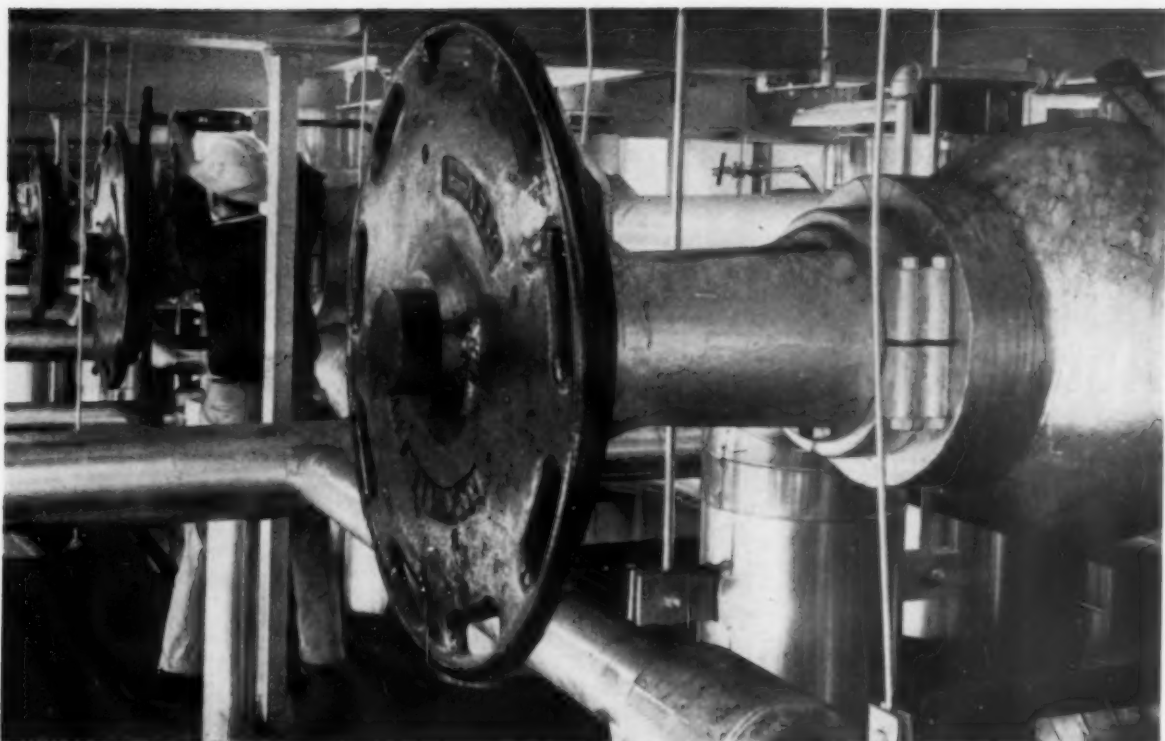
### **One Man Operates**

The Edwards Valves, Inc., Impactogear is a ring gear and pinion assembly fastened to the Impactor

handwheel and valve yoke. One man operates the Impactor handwheel with a portable air or electric wrench through the ring gear on the underside of the handwheel until the disk reaches the seat. Then a few blows with the Impactor handwheel seats the valve tightly. A 10-inch, 2500-lb class valve under pressure can be run down easily by one man in 2½ minutes from full open to seat contact. The power operator can be used any place in the station where 90-psi plant air or 110-v electricity is handy.

Barry Unit No. 3 is rated at 225,000 kw. It has a Combustion Engineering controlled circulation boiler producing 1,700,000 lb/hr at





ABOVE — Air wrench and gear operator make fast work of closing feedwater heater isolation stop valve. Eight 10-inch stop valves are used for heater isolation.

RIGHT — This gear operated 10-inch, 2500-lb class stop-check valve can be run-down easily by one man from full open to seat contact in less than 2½ minutes. Ten of these elbow-down stop-check valves are used on the boiler circulating pumps at Alabama Power Company's Barry Steam Plant.



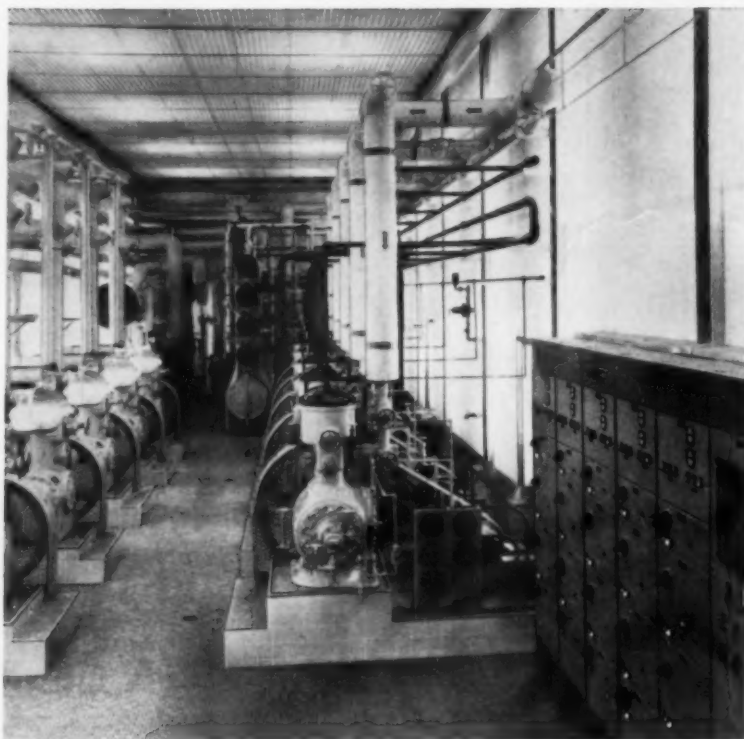
2200 psi at 1000 F, with reheat at 1000 F. Annual heat rate for all three units is 9300 to 9425 Btu per kw. Total station generating capacity is 475,000 kw.

The combination—gear assembly and handwheel—takes no more space than an ordinary handwheel. Impactogear is available for operation of any 8 to 16-inch Edward valves of 900-lb or higher pressure class, and 6-inch and larger 2500-lb valves.

## Refrigerated Warehouse to Help Make Corpus Christi the "Shrimp Capital"

By ELLIOTT HALLOWELL  
Consulting Engineer

# Automatic Operation and Control



Five booster and five second-stage ammonia compressors, with the automatic control equipment in right foreground.

**THERE'S A PLEASANT** blend of eye-appeal, unique use of electronic controls, and a study in modern warehouse engineering in the new plant of Alford Refrigerated Warehouses of Corpus Christi, Inc.

The Alfords decided, among many other innovations, that a warehouse didn't have to be unsightly. It only happens that many of them are. This one, with indirect fluorescent lighting glowing behind a ceiling and walls of corrugated translucent plastic, and with spotless tile floors in a gleaming, colorful machine room, is pleasing to the eye.

The 1,100,000 cubic feet freezer is built on the door-step of Texas' most productive shrimping grounds, and will help to make Corpus Christi the "Shrimp Capital of the World."

### General

The central warehouse portion of the plant has a frontage of 300 feet and a depth of 240 feet. Extending through the center of this

main building from front to back is a 50-foot-wide work space onto which open the cold storage rooms and which also contains the offices and machine room.

The warehouse floor is at truck height. A 20-foot-wide truck dock extends across the front end and a similar railroad dock extends across the rear. At the plant's front apron, 20 refrigerated trailers have room for parallel parking. Six refrigerated railroad reefer cars can be spotted at the rear docks.

In addition to the space occupied by the warehouse, a 50-foot-wide by two-hundred-forty foot addition has been erected along one side and leased to H. Morgan Daniel Seafoods Company for a complete shrimp processing plant and connected to the front of the warehouse building is a 50 x 75 addition which has been leased to the Nueces Provision Company for sea food processing and distributing.

Electrically-controlled Jamison Electro-Glide double leaf doors open to individual cold storage rooms on either side of the work area in the main warehouse. The rooms vary in size from the 125 x 200 foot freezer storage room, which occupies one entire side, to two rooms of 80 x 125 on the other. Temperatures in these rooms are held at minus five degrees Fahrenheit. Another room, more spectacularly frigid, is the 40 x 140 freezer maintained at minus 24 degrees Fahrenheit.

### Insulation

To maintain temperatures efficiently, Alford engineers put all of their proven insulating aids into the building. Several specialized types of insulation encase the steel framework.

A six-inch concrete sub-floor first was poured, and then a layer of insulation and a concrete floor

poured atop it. To prevent damage to the floor in event of high water table, or heavage that could result without some method of preventing low temperatures beneath the freezer room floors, six-inch concrete vent pipes were placed below the floors on six-foot centers.

Exterior walls and major interior partitions are of gunite construction with paper-backed mesh used for reinforcement. Insulation in the walls, as in the floor and ceilings of the cold rooms, is a semi-rigid board of mineral wool. A continuous film vapor barrier was used on the walls on the warm side and the interior of the walls were flash-coated with gunite to provide a porous surface. This porous surface prevents any moisture build-up in the insulation.

### Machine Room

The machine room is outstanding both in appearance and operation. Piping connections have been run to the sides of the room and all headers are supported from wall columns. Electrical conduits are in the floor with short connections at the various machines.

A 15-inch reinforced concrete floor was laid after machinery positions were carefully charted and electrical conduits were put into place with risers at appointed locations. All conduits emanate from the central switchboard — the G-E electronic brain. Equipment was placed on concrete blocks doweled to the main floor without other special foundation. After erection of the machinery, the entire floor and machine bases were tiled.

Refrigeration capacity of the plant is approximately 150 tons, based on minus 28 F ammonia suction temperature. This is achieved by use of five pairs of compressors, each pair consisting of a 7" x 7" Frick VSA compressor and an 8" x 6" Frick booster compressor. All refrigeration is two-stage, with

gas-and-liquid intercooler, and the machines are operated in pairs.

The high-stage machines are V-belt driven by 50-horsepower General Electric motors and the booster compressors by 30-horsepower motors of the same make. There are two suction headers in the plant, one for the brine chillers and one for the blast freezers.

All brine chilling is at sub-zero temperature and there is no load at the intermediate pressure of the plant other than the load from the boosters.

A liquid-and-gas intercooler is used between stages, and coil-type accumulators are used in the brine chiller and blast freezer suctions. Two 20" x 18" brine chillers are used. Ammonia level is maintained in the chillers with Alco float switches and solenoid valves. Two chillers were used for safety but in an emergency a single chiller could hold the storage rooms below the danger point. Three brine pumps of equal size are used — one as a spare.

The pumps discharge into a common supply header. Check valves are placed in the individual discharge of each pump to prevent back flow in case of shut-down.

A 42" x 15'0" Frick is used for the main condenser. In addition, three 16" x 12'0" condensers were installed for emergency use. A fourth 16" x 12'0" condenser was

converted to a brine heater. The liquid receiver is located adjacent to the main condenser under the 16" shells.

Condenser water cooling is done by a Marley two-fan induced-draft cooling tower mounted on the roof above the machine room. Each pair of compressors has its own condenser water pump which operates automatically as the machine pair is used. All five condenser water pumps discharge into a common header and receive water from a common supply header. Kay Engineering Company of Dallas furnished all Frick equipment. All pumps were manufactured by the Ingersoll-Rand Company and are powered with General Electric motors.

Warm brine is used to defrost the coils in the storage rooms. This brine is obtained from a shell-and-tube condenser which was converted to a brine heater. Large ammonia inlet and outlet connections were placed in a 16" x 12' condenser and the brine circulated through the tubes. When warm brine is desired, the hot gas from the high-stage machines is by-passed through this shell.

### Room Refrigeration

Some 70,000 lineal feet of steel pipe is used in the coils which carry brine as the refrigeration media into the cold storage rooms. Pipe

Mrs. Fred F. Alford, Jr., demonstrating Guniting to Virgil Young, General Superintendent, and Fred F. Alford, Jr., President of the Corpus Christi plant.





coils are arranged in banks in the various rooms and the banks looped for even brine flow through all coil banks. Temperature control is achieved by means of Barber-Colman three-way modulating valves controlled by modulating thermostats. These valves maintain even temperatures by by-passing brine flow around the coils as the load falls off.

The blast freezer is equipped with Recold full-flooded ammonia coils arranged in banks of four. Each bank has its own accumulator with float switch and solenoid valve control. Temperature control is maintained by cycling the machines on this load.

The Alford patented jet blast method of freezing gives great flexibility and efficiency. Capacity of the freezer is substantially unlimited. Defrosting of the coils is by automatic water defrost. A timed cycle pumps out the units, applies the water defrost, waits for a drain period and then puts the units back into operation. The complete defrost cycle is automatic and requires no attention other than a periodic check.

### Control Panel

At the entrance to the machine room is a General Electric load center type distribution panel, especially designed for the Alford plant. This center consists of nine adjoining panels with an overall length of 18 feet, and contains all the electrical switching gear.

The first five panels contain the motor starters for the five pairs of machines and their condenser water pumps, automatic control selector switches and control relays, and other starters needed in the operation of the plant. Included in the other sections are the incoming circuit breakers, plant ammonia pressure gauges, temperature recorder, alarm panel and other automatic control components.

Power received at the panel is 440 volts, three-phase, 60 cycle. There are two main incoming circuit breakers. One has a capacity of 800 amp and serves the machine room. The other has a capacity of 400 amp and serves the balance of the plant. Individual circuit-breakers feed power out to the

various plant utilities. For lighting and other low-voltage applications, dry type transformers are used to give 120/240 volt three-wire single phase current.

Each starter in the machine room is protected by its own circuit breaker, and the magnetic starters all have overload protection. All starters are in the panel rather than at the individual motors. Approximately 300 electrical connections are made in the panel from the plant apparatus and controls.

A Minneapolis-Honeywell 16-point temperature recorder is used to record cold-room temperatures, various temperatures in the machine room, and also below-floor temperatures in the cold storage rooms.

### Automatic Control

Control of machines and temperatures is entirely automatic. The machines always operate in pairs, one high stage and one booster operating together. Each machine pair may be set for either suction header. The valving of these machines to their respective headers — needed only at infrequent intervals — is the plant's only manual operation.

An individual selector switch at the control panel for each machine pair sets up the automatic control for the particular machine pair for the load desired. The selector has also an "off" position in case it is desired to keep a particular pair idle. Normal loading of the plant does not require all machines to be in operation.

The control circuit for the plant is powered from a separate transformer and all controls operate at 115 volts. The control circuit first is fed through a magnetic contactor to provide undervoltage protection and also prevent start-up of the plant after a power interruption until manually inspected and re-set. It also prevents the entire plant coming on at one time after shut-down. This contactor is actuated by push-button control.

Individual machine pair panels are similarly protected. The main control circuit is then fed through a series of "prime" safety controls, any one of which will shut down the entire plant and after shut-

down require manual re-setting.

In addition to the safety circuit above, each machine is equipped with safety controls which will shut down the affected machine pair but not the entire plant. All controls for safety switching are Mercoid switches with hand reset.

Each high stage machine is equipped with high and low pressure safety cutouts, cylinder high temperature cutouts, water jacket high temperature cutout and Penn Electric oil pressure failure switch.

Each booster compressor is equipped with high and low pressure cutouts, cylinder high temperature cutouts and oil pressure failure switch. No jacket thermostat is employed on the boosters since they are cooled by direct-expansion ammonia.

Each safety device is equipped with a double circuit, and one circuit is used for a Panalarm system mounted on the main panel board. This sub-panel consists of a number of small opaque glass windows with each safety device nomenclature printed on an individual window.

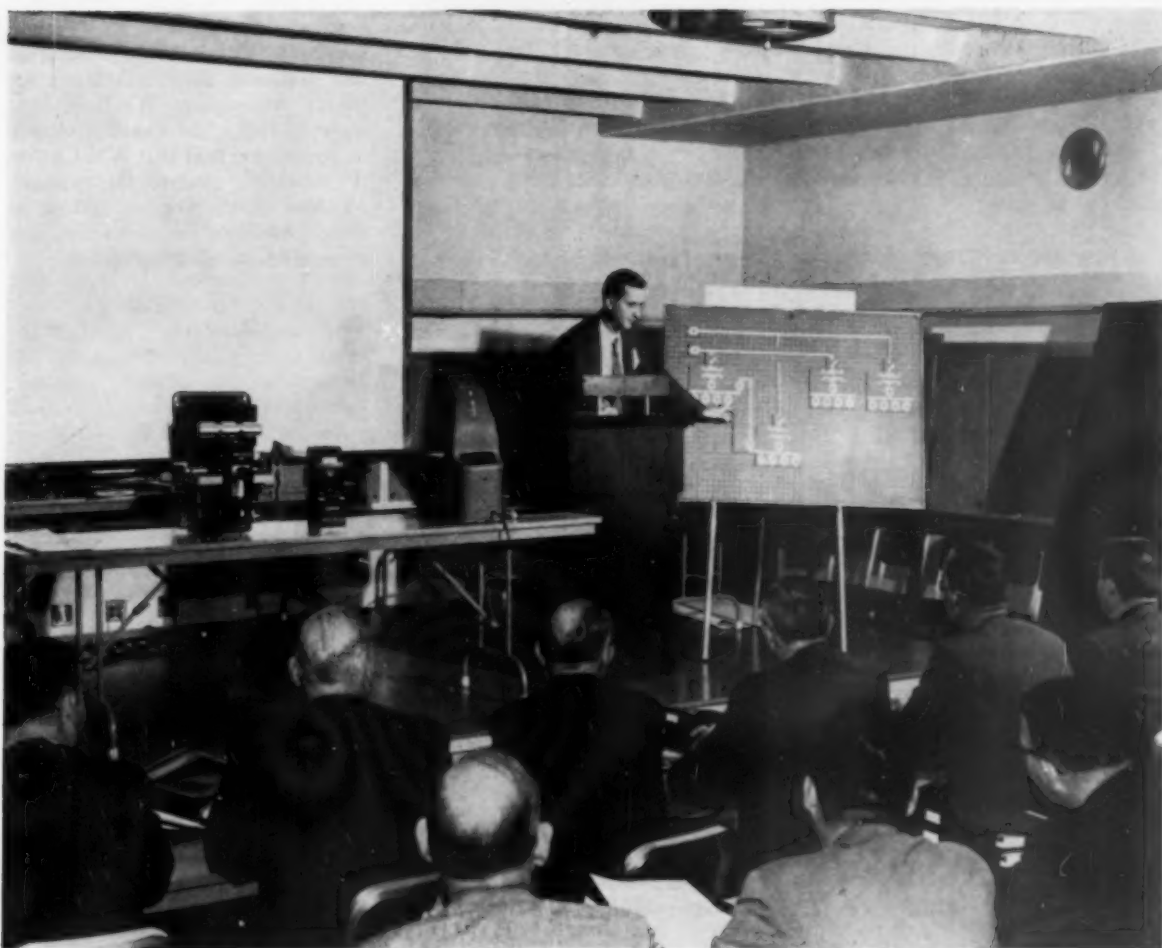
On a failure of a device, a light is turned on by the extra circuit illuminating the particular window of that device. In this manner the operator can glance at the Panalarm system and tell immediately where the trouble is to be found.

In addition to the lights, the failure switches are also connected by relay to a horn and light (external to the machine room) and to the telephone switchboard to a watch service. Thus if the plant shuts down when unattended, the warning can be transmitted by phone to anyone designated.

A switch at the panel board permits only the prime safety circuit to be transmitted as an alarm when the plant is not attended, or the entire safety circuit may be cut in.

The goal of the plant design was to achieve an entirely automatic operation so that the plant can be left unattended during periods when the warehouse is closed and also to achieve absolute safety to the plant at all times. Several months operation have shown that this goal has been realized and the plant has come up to expectations.





Instructor G. R. Davis, West Penn Power Company, uses magnet board supplied with course to illustrate a one-line diagram. Overhead projector and demonstration table are at left.

## Industrial Power Distribution Course

**THE INDUSTRIAL** Electrification Council has released its Industrial Power Distribution Course for sale to electric utilities, electric leagues and to other groups who may be organized to put it on.

The primary purpose of the course is to train industrial plant personnel in the selection of electrical systems and components, to better appreciate the latest equipment, methods and techniques, as well as the many advantages of good electrical distribution. It will also be of value in familiarizing industrial power sales engineers, equipment salesmen, jobbers, distributors, and contractors with in-

dustrial electric power distribution systems.

Designed for presentation in ten 2½ hour demonstration-type lectures, the course covers:

- Basic components of a distribution system
- One-line diagrams
- Voltage selection
- Voltage regulation
- Power factor improvement
- Conductors
- Electrical estimating
- Protective devices
- Control motors and other power use equipment
- Preventive maintenance

- System planning
- Selection of primary voltage
- Transformers
- Unit substations
- Lightning protection and overvoltages
- Estimating cost of medium voltage installations
- Relay selection
- System grounding

The course was developed and field-tested by West Penn Power Company with highly satisfactory results. The accompanying photographs illustrate a few of the highlights of their presentations.

It is sold in the form of a kit consisting of (1) fifty student text-

books and diplomas, (2) two Leader's Guides — one each for the instructor and his assistant, (3) one hundred thirty-seven slides, (4) "The Busway Story" (a 2" x 2" slide kit), and (5) a 3' x 4' magnet board with a complement of symbols and magnets.

Provision is made for the use of four demonstrators, five films, and

three sound films available on loan from manufacturers. The cost of the complete kit is \$400.00 f.o.b. New York. Extra student texts, the only equipment needed for additional presentations, are available at \$2.00 each (10% extra to non-members of IEC).

This is the first program to be released by The Industrial Electri-

fication Council since its co-sponsorship by Edison Electric Institute and National Electrical Manufacturers Association effective January 1, 1961. The Council wishes to emphasize that this is not a "do it yourself" course. Its primary purpose is to educate industrial plant personnel on the advantages of good electrical distribution.

### **Prototype Unit in Houston Power & Light Co. Plant**

## **New Unit Completes Initial Run**

**INCORPORATING** many new developments to minimize distortion and control thermal expansion, the Allis-Chalmers 220-mw tandem triple-flow turbine serving Houston Lighting & Power Co. (at left in this night view), has completed its initial run.

Largest of two Allis-Chalmers units at the T. H. Wharton outdoor station, the unit was shut down recently for its first major maintenance-inspection. From its start June 1, 1960, it has had an unusually high availability factor. It is now back in service and is ex-

pected to operate almost continuously for the next three to five years.

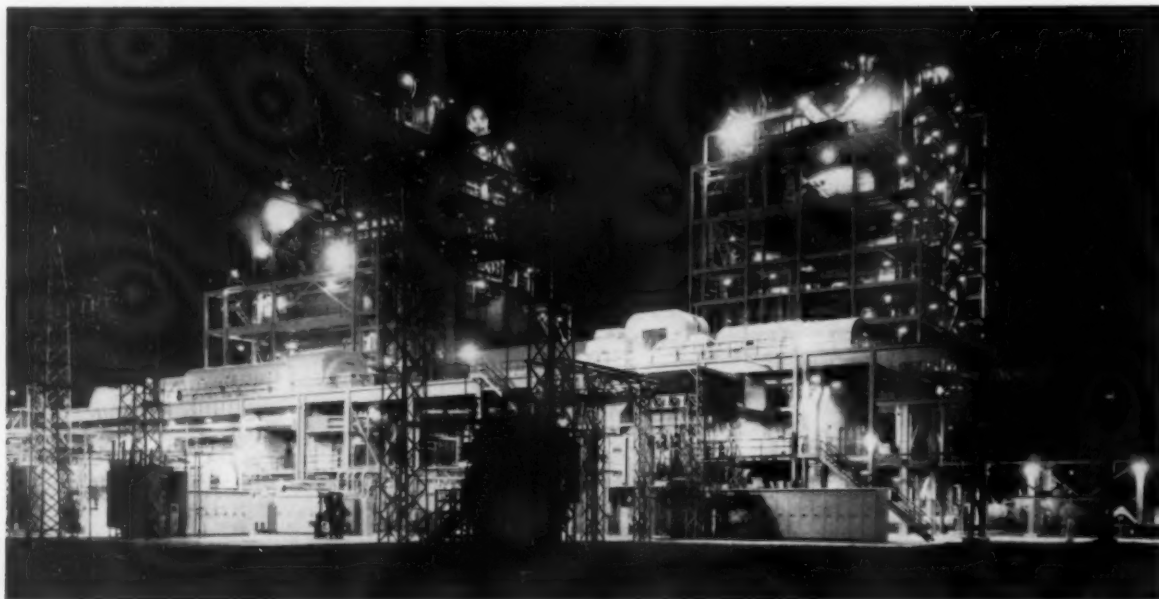
The steam turbine for this compact generating unit operates on 2000 psig, 1000 F throttle steam with a single reheat to 1000 F. It drives a 265-mva fully-supercharged generator, one of the largest in operation.

Representing the first tandem machine to employ separate blade rings in the centerline-supported inner high-pressure cylinder, the unit also has oil spray-cooled high-temperature pedestals and a sec-

tionalized oil flushing system. The outdoor turbine housing is sectional pressurized and the walk-in exciter housing is hurricane protected.

Opposing steam flows in each cylinder balance the steam thrust forces within individual turbine elements. Operating stability is further improved by locating the unit's thrust bearing between the first two elements to minimize differential expansion.

Turbine at right in this photo is an Allis-Chalmers AIEE-ASME standard unit.



## Economic Welding of T-1 Steel

**THE ROME PLOW** Company, Cedartown, Georgia, uses Lincoln Electric Company's semi-automatic submerged arc welders to fabricate T-1 steel, thereby controlling manufacturing costs while reducing weight and improving product performance. Incorporating T-1 steel in the cutting edge and stinger of their land clearing blade has resulted in increased strength and wear resistance, which improves the performance of the product.



Submerged arc welds joining T-1 sections are made with Lincoln's ML-2 and ML-3 squirt welders using an agglomerated alloy flux and mild steel electrode. Alloy is picked up in the weld deposit from the flux melted by the arc heat. Physical properties match the plate. Other welds joining T-1 to SAE 1040 steel and 1040 to 1040 are made in the same manner using a neutral flux. Extensive use of the automatic submerged arc process enables Rome to design these desired features in the product and still control the cost.

# What's The Difference

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It's stocking the *right kinds* as well as quantities of steel and aluminum products for instant shipment. It's providing accurate recommendations on various metals and helping customers find the most economical as well as the most suitable materials. It's the careful attention to every detail of every order.

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# CLEAN BOILERS THE EASY WAY

By JOHN M. GRIFFITH

Mechanical Engineer, Maintenance Engineering Div.  
Continental Oil Company, Ponca City, Oklahoma

**YOU CAN REDUCE** cost and take a lot of the hard work out of boiler maintenance—by chemical cleaning; but the use of chemicals will not be successful unless the work is done correctly. A lot of preplanning is necessary to insure a successful chemical cleaning job.

To begin with, the scale found in boilers differs from "normal" water scale found in coolers and heat exchangers. This means that you cannot apply conventional acid washing techniques to boilers. Boiler scale will commonly contain carbonates, phosphates, silicates, sulfates, and iron oxides depending upon raw water composition and feedwater treatment.

It is necessary to secure a sample of the boiler scale and run chemical cleaning tests to determine correct acid strength and contact time.

If any oil is present in the scale,

it may be necessary to prewash the boiler with an alkaline solution. To aid scale disintegration, the addition of 50 to 90 pounds of ammonium bifluoride per 1,000 gallons of acid solution may be necessary. The acid used may be inhibited sulfamic acid or inhibited hydrochloric acid. The best choice can be determined by laboratory tests.

It should be stressed that a very effective acid inhibitor needs to be used. With the great number of acid inhibitors and proprietary acids on the market, there are some that are very good and, of course, some that are very poor. The inhibitor should provide protection up to 190-200 F.

In Continental Oil Company's case, a great number of laboratory corrosion tests were run before an inhibitor was selected. We buy raw hydrochloric acid in bulk and

inhibit it just prior to use.

An inspection should be made before chemical cleaning to determine the extent of scale deposition and the mechanical condition of the boiler. Areas around welds, tube ends, and tube rolls should be examined for corrosion before and after acid cleaning. In some cases where the boiler has considerable sludge in it, the tubes and drums should be washed out before acid cleaning.

Acid cleaning a cold boiler should *never* be attempted. A cold boiler will cool the acid solution below the desired temperature and hinder scale disintegration. The acid solution *cannot* be heated by firing the boiler because the skin temperature of the tubes will exceed the maximum temperature limit of the inhibitor.

## Step-by-Step Procedure

Given below is a step-by-step procedure that can be used as a guide in planning boiler chemical cleaning. Some steps are given that are not applicable to all boilers. It may not be necessary to open the boiler before acid washing unless severe scaling is suspected.

1. Open drums and flush out sludge. Inspect to determine extent of scale deposits.
2. Remove several floor hand-hole plates and wash out any loose scale.
3. Blind or close valves on all lines to isolate the boiler. Blind all 11/13 chrome trim valves.
4. Remove pop valve to provide a vent at the top of the boiler.
5. Preheat the boiler with hot boiler feedwater. If care is taken,



Chemical cleaning wagon used to clean boilers and heat exchangers.



the boiler with feedwater in it can sometimes be preheated by lighting a burner and turning it very low. The boiler skin temperature should be 170-180 F.

6. After the boiler has been preheated, fill to operating level with 170 F acid solution. It is usually desirable to keep acid out of hairpin superheater tubes because of the difficulty in flushing them. Acid contact time will usually be from 8 to 16 hours.

7. Drain the acid solution and fill and drain the boiler twice with water to flush out the acid solution.

8. Neutralize the boiler with a solution containing 100 pounds of soda ash per 1,000 gallons of water.

9. Reinstall the pop valve and bring the boiler up to low pressure to obtain circulation.

10. Drain soda ash solution, fill and drain boiler twice with water to flush out the soda ash solution.

11. Open and inspect.

#### Cost of Cleaning

The cost of chemical cleaning boilers depends mostly on the cost of the chemicals used. The labor involved is not too great. The acid requirements for our 90,000 pound per hour boilers are about 1,000 gallons of 32 per cent hydrochloric acid per boiler. Each boiler has a capacity of about 4,500 gallons.

Because of our bulk purchase of 32 per cent hydrochloric acid, our cost runs about 16 cents per gallon, including the inhibitor that is added just before use.

#### Special Care

Let us review the important steps in chemical cleaning a boiler:

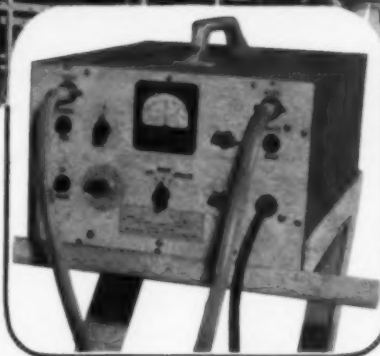
1. Obtain a representative scale sample and run laboratory solubility tests. Determine acid contact time and optimum acid strength.

2. Make sure that the inhibited acids are safe. They should have a low corrosion rate at 190 F-200 F.

3. Preheat the boiler properly.

4. Do not fire the boiler to heat the acid solution.

5. Neutralize with a soda ash solution.



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7213 Kingston Pike Knoxville 19, Tennessee TELEPHONE 588-5731

# Accidents Can Be Controlled

By  
**L. J. Carmack**  
Metairie, Louisiana

**THE SUCCESSFUL** safety program is not an accident, it is a well planned operation. Let's define what we mean by accident. An accident is a mishap; an unplanned occurrence. It may or may not result in an injury or damage to equipment.

Whether you have a new plant or an old installation, the elements of a successful accident program are almost identical. Success involves much more than placing a few placards on the bulletin board, and a speech by the plant manager. It means the expenditure of money and man-hours to accomplish the desired results.

When we have plant operating difficulties, we always take one step: Find the cause. Will this work in regard to safety? Yes! The accumulation of data by industry, insurance companies, and other independent organizations has been going on for years. A study of the accidents of one department of 250 employees revealed that about 90% of the accidents were the result of an unsafe act on the part of the employee. This figure compares closely with other plants and the national figures.

Additional human factors were also uncovered. The unsafe conditions were usually of human creation. By lack of knowledge or foresight they were left unnoticed until an accident brought them to someone's attention.

Thus it can be seen that a safety program is a program to change and control the actions of human beings. It is a program of the control of people, their thinking, their actions. It becomes a problem of mental attitudes on the part of the employees. When each employee

makes up his mind to stop accidents, they will stop, not before.

The important parts of a safety program can be broken down into:

1. Publicity
2. Salesmanship
3. Education
4. Follow-up

A successful program must have sufficient publicity to accomplish two things. It should make employees aware of the project, and arouse their interest. It can be handled upon a basis of a drive to increase time between lost time accidents or lower the accident frequency. A contest between departments or between plants usually arouses the competitive spirit of a group. The publicity and advertising is only the beginning and the hard work is still ahead.

## **Salesmanship**

Following the publicity to inform and arouse interest, a program of salesmanship must begin the selling job to the employees. After the publicity, many people will still have the idea, "It can't happen to me." This is a rather prevalent idea and is one of the biggest hurdles that must be overcome.

Some employees have the idea that a safety program is sissy. Here, the hard sell begins. The employees must be convinced that it is their program, that they are the ones to reap the benefit. This becomes a problem of developing the proper attitude in the employees. It is in this phase of the program that a core of experienced supervisors who can mold employee attitudes is essential. If the experienced supervisors are not available, it will be necessary to train

your supervisors before any such program starts. After the employees' attitudes are such that they are receptive to the safety ideas, another phase is started—education.

For each and every job "there is a safe way." For many training means just teaching the proper way to do their tasks. However, for a goodly number it means changing the way they have been working for years. Here again many will resist the changes, and salesmanship must be used to effect the change. The key of this part of the program is to develop habits—safe habits. By this we mean that working safely becomes the employees' way of doing things. Safety must be a habit if the craftsmen are to perform their work without detailed supervision all of the time. This, many will think is the end of the program. However, the next phase must start: follow-up.

## **Follow-Up**

A successful safety program is a dynamic program. It cannot be started and stopped, it has to keep going. The program must continue—any sign of complacency will be reflected in an immediate and continuing rise of accidents. This part of the program should consist of regularly scheduled safety meetings for the workers. Also meetings for the supervisors to review the progress and pass on up-to-date information.

The house organ publication is a good way to continue passing on safety ideas. A large plant safety sign should be constructed giving days since last lost time accident, a current safety slogan and other eye-catching information. The use of posters on plant bulletin boards is also a means of passing on safety information.

The most important part of the follow-up is investigation and study of the accidents. Find the cause and take measures to prevent their recurrence. There is only one good thing about an accident; it can be studied and the information used to prevent another.

## **Benefits**

If any plant starts and carries out an accident reduction program

# YARWAY **Y** news briefs

from Yarnall-Waring Company, Philadelphia 18, Pa.

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ATLANTA OFFICE: 463 IVEY BUILDING, 3330 PEACHTREE ROAD, ATLANTA 3, GEORGIA



## THIS STEAM TRAP WILL DISCHARGE 25,500 LBS. OF CONDENSATE PER HOUR

This is a typical installation of a Yarway Series 40 Impulse Steam Trap—a trap designed specifically to gobble up extra heavy condensate loads.

The trap is a No. 48, 2½" size, and is installed on a suction heater connected with an 86,000 barrel tank containing fuel oil at a storage terminal. The operating pressure is 13 psi. At this pressure the trap has a capacity of 25,500 lbs. continuous discharge of condensate per hour.

At operating pressure of 100 psi, the trap's capacity is 62,000 lbs. per hour.

### CAPACITY—PLUS

Capacity isn't the whole story on Yarway Series 40 Steam Traps. Like all Yarway Impulse Traps, they offer advantages like quick heat-up, even temperatures, small size, good for all pressures, non-freezing.

Series 40 traps also feature high temperature discharge characteristics, excellent low pressure operation, no airbinding, operation against back pressures up to 40%, and stainless steel construction.

You can get Yarway's latest steam trap Bulletin T-1743, or arrange for a free 60-day trial of a Yarway Impulse Trap, by writing to Yarnall-Waring Company or contacting your local Industrial Distributor.



Yarway ½" No. 40 Impulse Steam Trap (shown actual size). Also available in ¾", 1½", 2" and 2½" sizes.

### YARWAY OFFERS IMPULSE STEAM TRAPS FOR THESE SPECIFIC OPERATING CONDITIONS

AVERAGE  
CONDENSATE  
LOADS



Series 60

EXTRA HEAVY  
CONDENSATE  
LOADS



Series 40

LIGHT  
CONDENSATE  
LOADS



No. 30

such as this, it will notice a reduction in accidents. There will be other benefits such as better morale among the employees as they will feel that the company has a human side also.

### Responsibilities

We have not commented on the responsibilities of the three groups concerned: 1) The employees, 2) The company, 3) The supervisors.

The employees must accept their share of the responsibility for the accident reduction program. They must accept the rules and regulations that may be put into effect as result of investigation. One of the most important things is for them to report all near injuries to their supervisors so other occurrences will not result in actual injury to them, or other employees.

Most people in any group will be receptive to an accident prevention program. However, there will be a few who will resist. Employees can do a lot in getting full cooperation of their fellow workers. In any group all members must accept some responsibility for the others. Many accidents can be prevented by only a word of caution from some fellow worker.

### Safety Engineer

The company should provide a Safety Engineer on its staff to aid in and generally oversee the program. The Safety Engineer can consult with management and advise on the problems for the particular company. He can consult with the supervisors and assist them in carrying their part of the program. The Safety Engineer can

be considered as the spark plug of the whole program.

A Safety Engineer will provide invaluable aid by making inspections and calling attention to sub-standard conditions. He can study all accidents, determine the true cause, and advise the supervisors of his findings. If the installation is small, one person should be appointed to carry out these functions if only on a part-time basis.

### Supervisors

There is one group of people who will actually make the program—the supervisors. It is the first-line supervisory personnel who carry the ball in a program. Along with their other duties of planning and directing the efforts of the workmen, they must keep safety in the forefront. Upon them falls the job of carrying through the program.

It is very seldom that supervisors complete the accident report forms so that intelligent review can be made. In most cases if you don't talk to the person concerned, you will not know exactly what happened. If the reports are completed properly, they will contain information needed to carry out the accident control program. The supervisor can be trained to investigate each and every accident and submit a report of his findings. The report should contain the following information:

1. Location: The location should pinpoint exactly where the accident occurred—such as compressor control room, back of No. 1 boiler, purification tower.
2. Machine or equipment connected with the accident: The report should state the piece of equipment or machine on which the man was working—such as yard air compressor, boiler feed pump, reboiler, induced draft fan.
3. Action taking place at time of accident: The full description of what the injured person was doing just before and at the time of the accident. This might be: lifting a pipe, tightening a nut, pulling wire through a conduit, moving pump, etc.

SUPERVISOR'S ACCIDENT REPORT			
Department _____	Date of Accident _____	Time _____	A.M. P.M.
Name of Injured Employee _____	Badge # _____		
Type of Injury _____	Part of Body _____		
Location of Accident _____			
Description of Accident _____			
Primary Cause of Accident: Unsafe Act _____ Unsafe Condition _____			
Preventive Measures Taken _____			
Supervisor _____ Date _____			
Reviewed by Dept. Supt. _____ Date _____			
Comments _____			
Reviewed by Safety Engineer _____ Date _____			
Comments _____			



4. How the accident happened: The report should give full details. Was the man working alone? Was he in a group? Did the act of someone else contribute to the accident? Just what occurred to cause the injury?
5. Was the injured person using the specified guards, protective clothing, etc.? In most installations, many guards and protective clothing are available to the employees. In some cases the injured should have been wearing the protective clothing provided. To fully evaluate the report, information on protective measures taken by the injured should be given.

There is considerable tendency of people to state that the injured person was careless. This as a cause of an accident has no value in studying preventive action. The word "careless" covers many actions of people, and it should not be permitted in an accident report. The things which most people call carelessness can be broken down and given as causes, such as the following:

1. Disobedience of rules.
2. Ignorance of rules.
3. Inattention to work, or failure to be alert.
4. Not following instructions.
5. Lack of complete instructions.
6. Interference by others.
7. Not using protective devices or protective equipment.
8. Lack of skill or experience.
9. Poor judgment.
10. Taking chances.

When the Supervisor's Accident Report is completed, the information is very valuable in indicating where the trouble spots are located. The Supervisors in many cases do not realize the importance of this information and they may have to be "sold."

A program such as this one must have wholehearted support and cooperation of all concerned. Then all personnel can take satisfaction in having a part in a program which saves lives, reduces pain and suffering, saves equipment and makes money for the company.

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## AMES IRON WORKS, INC.

BOX L-41 OSWEGO, NEW YORK

# MANAGEMENT CLINIC

Conducted by ROBERT H. EMERICK, North Charleston, S. C.



## How to Stop Employee Indulgences

### Question . . . . .

**IF WE STOP CERTAIN** employee indulgences of long standing, such as overlooking time taken out to cash personal checks, or to make private telephone calls, and even to leave the job early in order to be cleaned up and ready to go at the end of the shift, can this stoppage be interpreted as constituting a change in working conditions, and therefore subject to challenge by the Union?

This action is one of several we are planning on, to lower production costs and improve our competitive position. This is essential, if we are to survive.

### Suggestions . . . . .

**THERE IS A POSSIBILITY** of the Union making a case out of the projected action on the grounds of estoppel, a legal term meaning the plaintiff has the right to rely on the past practices.

Against this possibility, the Agreement wording may offer a defense in the form of a residual rights clause or declaration. A typical wording of this clause, or declaration, is like this:

"The Company reserves all rights, powers and authority customarily exercised by Management, except those which are specifically surrendered or abridged in this Agreement.

If the Agreement in this case does not specifically bar Management from interfering with the employees' current freedom to transact personal business on Company time and without any penalty in loss of pay or otherwise, a residual rights clause would allow the proposed stoppages, in our opinion.

We base this opinion on the fact that the "rights, powers and authority customarily exercised by Management," included among other responsibilities, the efficient directing of the labor force.

Obviously, a directing authority that consistently overlooks departures from the work, whether these departures occur haphazardly during the day, or are used to shorten the working period, is not functioning efficiently. In these circumstances, and particularly in view of the vital need for reducing production costs, the elimination of any luxury or indulgence that adds to these costs, is not only a right but a duty of Management.

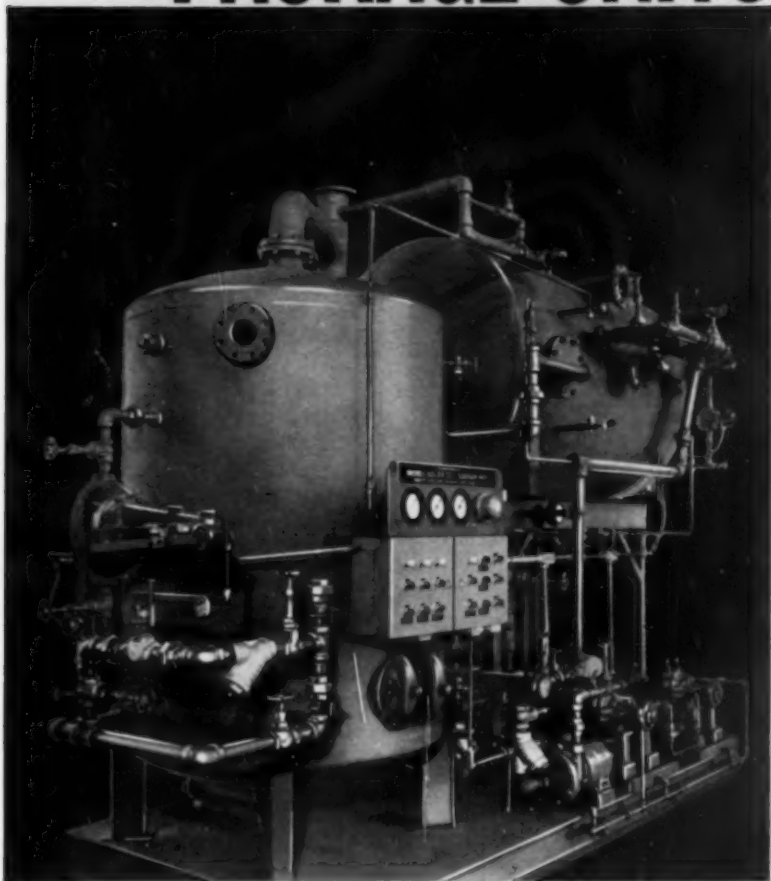
Repercussions from the new policy can be expected. Our suggestion is that the Union stewards be informed of the proposed plan and the necessity for it, at least 24 hours before it is announced to the employees in general. Their understanding can be very helpful in meeting the first wave of resentment, and possibly in avoiding the filing of a later grievance.

Notices on the bulletin boards should carry with the new policy, a statement on punishments for violations. Setting the effective date 10 days after the notice, also is a recommended procedure.

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Wickes Boiler Co. now offers a packaged system of various compact combinations of DEAERATING FEED WATER HEATERS, BOILER FEED PUMPS, CONDENSATE SURGE TANKS and BLOW-OFF TANKS. Standard units available for steam plants of 10,000 to 100,000 lbs. of steam per hour capacity and steam pressure to 300 PSIG. Information on special units of higher capacities and pressures upon request. Each unit is shop-assembled on a structural steel base, completely piped and wired and equipped with all necessary controls and an instrument panel.

Write today for Bulletin 59-1, which gives detailed engineering information on all three models of Wickes Boiler Auxiliary Package Units.



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WICKES BOILER CO., SAGINAW 14, MICHIGAN  
*Division of The Wickes Corporation*

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# Centrifugal Pump Clinic

## QUESTIONS and ANSWERS Conducted for SPI Readers

By IGOR J. KARASSIK

Consulting Engineer and  
Manager of Planning  
Harrison Division  
Worthington Corporation

### How to Control End Float

#### QUESTION:

**CAN YOU ADVISE** me where I can find a detailed discussion on the subject of "end float" of shafts of motors which have sleeve bearings and are directly coupled to centrifugal pumps? Are there similar limitations regarding "end float" of a shaft when the pump is coupled to ball bearing motor? (V. L. D.)

#### ANSWER:

**HORIZONTAL SLEEVE** bearing electric motors are not generally equipped with thrust bearings but are merely provided with babbitted faces or shoulders on the line bearings. The motor rotor is allowed to float and, while it will

seek the magnetic center, a rather small force can cause it to move off this center. This movement may, in some cases, be sufficient to cause the shaft collar to contact the bearing shoulders, causing heat and bearing difficulties. This is particularly true of large electric motors of 200 hp and higher.

Since all horizontal centrifugal pumps are equipped with thrust bearings, it has become the practice to use "limited end-float" couplings between pumps and motors in this size range. These couplings keep the motor rotor within a restricted location.

The motors are built so that the total clearance between shaft collars and bearing shoulders is not less than  $\frac{1}{8}$ ". In turn, the flexible couplings are arranged to restrict the end-float of the motor rotor to less than  $\frac{3}{16}$ ".

The restriction against closing the gap is provided by one of the following methods:

1—For gear-type or grid-type couplings: by locating a "button" at the end of the pump shaft or by inserting a predimensioned plate between the two shaft ends. (See Fig. 1.)

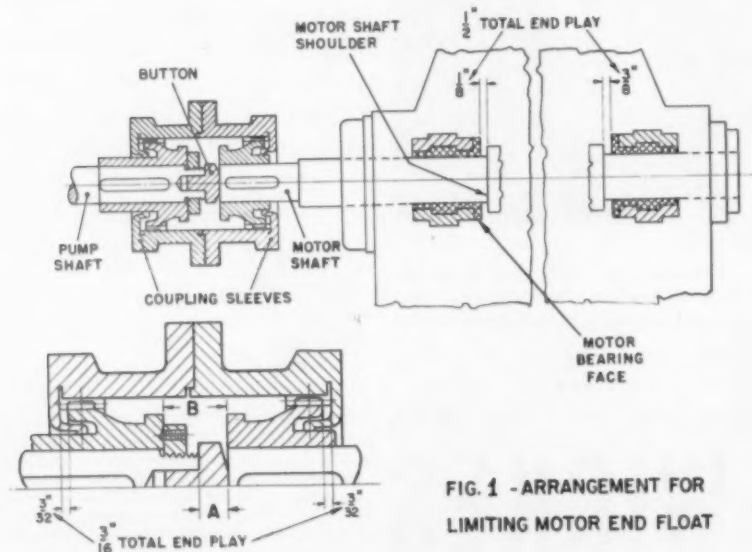
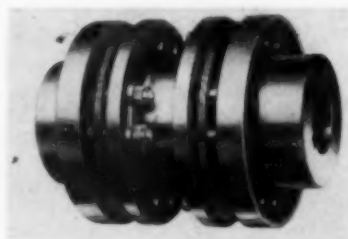


FIG. 1 - ARRANGEMENT FOR  
LIMITING MOTOR END FLOAT

Fig. 2. Restriction against closing the clearance gap is provided by the stiffness of the flexible discs.





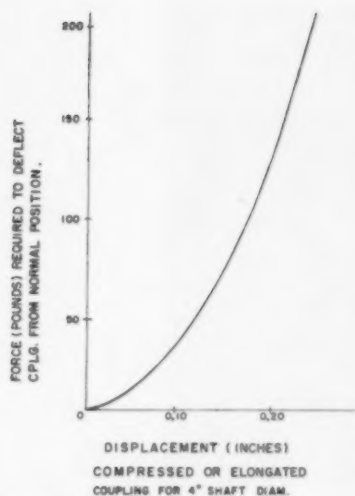


Fig. 3. Displacement characteristics.

2—For the flexible-disc type, such as the Thomas coupling (Fig. 2): by the stiffness of the flexible discs themselves, which have inherent float restricting characteristics. The displacement characteristics of a coupling of this type (for a 4" shaft diameter) are shown on Fig. 3.

Contact between the hubs and the coupling covers prevents excessive movement in the opposite direction for gear-type or grid-type couplings. The stiffness of the flexible discs is the restraining force in both directions in the case of the Thomas couplings.

The problem does not arise in the case of ball bearing electric motors and therefore they do not require the use of "limited end-float" couplings.

## Visible Water

**SINCE EVEN** under ideal lighting conditions, it is at times difficult to see the correct water level in a boiler gauge, we stick on the back of the glass tube a ¼-inch-wide strip of red tape.

Above the water level, the tape appears narrower than it actually is. Below the water level, it is magnified, so the tube seems filled with red liquid.

The tape is installed lengthwise of the tube, for its entire length.

By S. CLARK

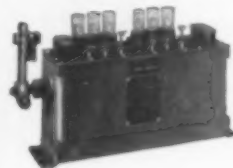
Bradenton, Florida

# HOW THIN can you



## slice a drop of oil?

Whether you want to deliver several drops or the minutest fraction of a drop per piston stroke, a Manzel lubricator will do the job exactly. Manzel lubricators force oil of any viscosity against the high steam, gas and air pressure so common in modern compressors, engines and machines. They start, stop, speed up or slow down in synchronization with your equipment. Write for our catalog explaining the whole line. Manzel, 257 Babcock Street, Buffalo 10, New York. For efficient lubrication



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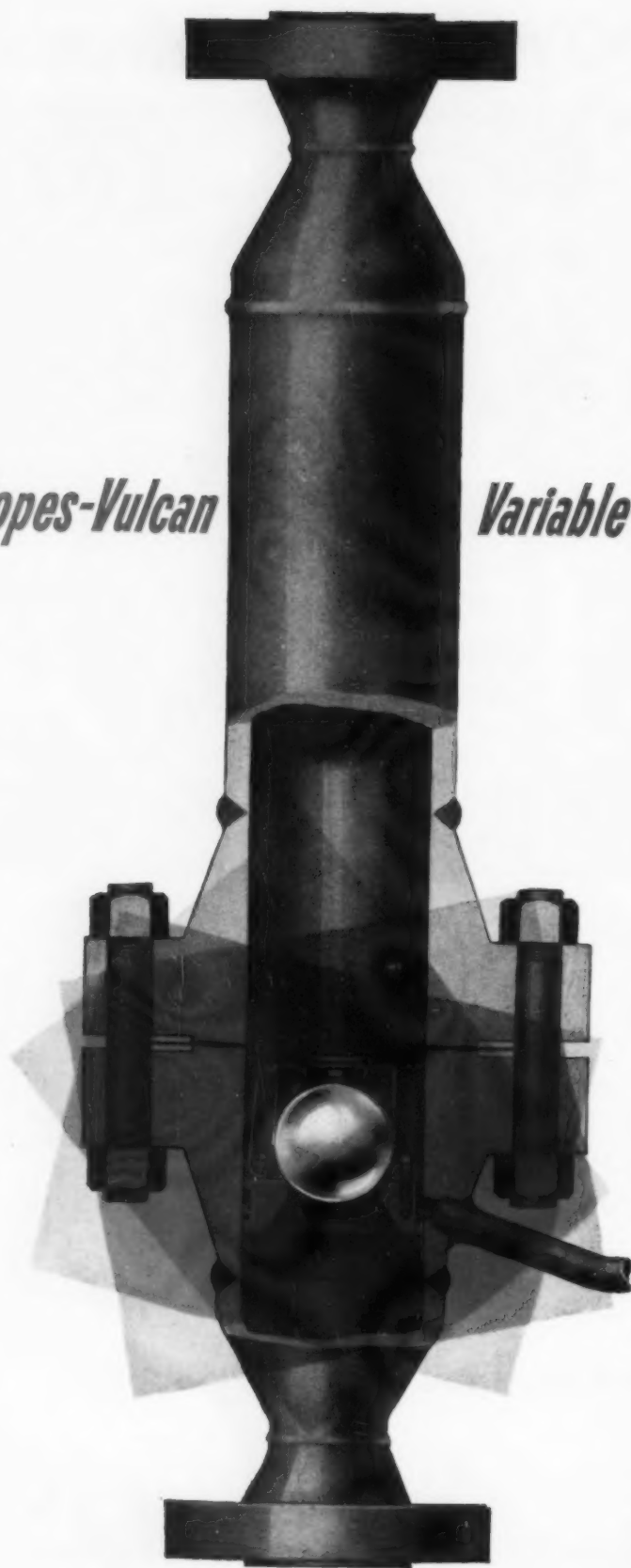
# Manzel

SPECIALISTS IN LUBRICATORS AND METERING PUMPS

SINCE 1898

*Copes-Vulcan*

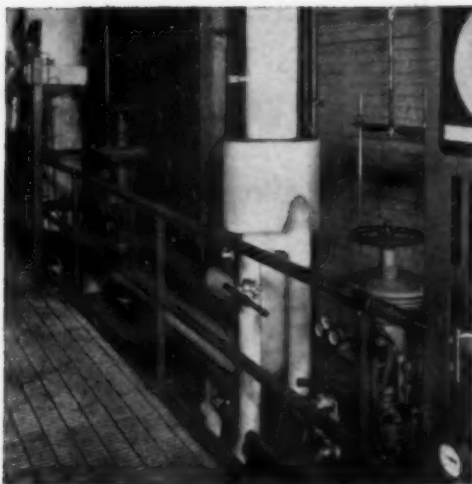
*Variable-Orifice desuperheater*



**This ball makes the difference.** Steam pressure lifts a weighted steel ball off its ring seat to a position where it is balanced by steam pressure and flow through the orifice. The ball is held concentric by Inconel springs and rigid guides. This is the only moving part in the Copes-Vulcan Variable-Orifice desuperheater that so effectively controls steam temperature.

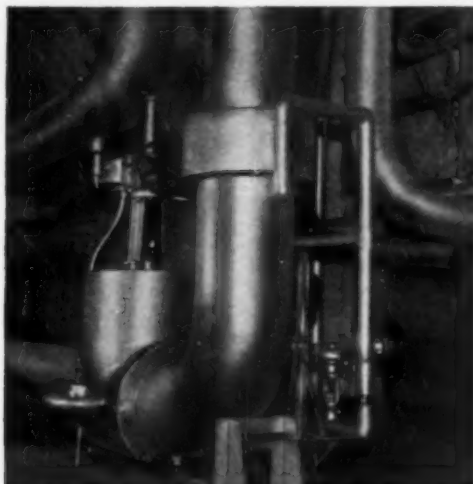
Cooling water enters through an annular orifice surrounding the ring seat at the point of maximum steam velocity. The passage of steam through the annular restriction between ball and seat produces an aspirating effect on the cooling water and entrains it in an area of high turbulence over the full range of flow.

No long run of piping is needed to mix the two fluids. There is no excess water to remove. No atomizing steam is used. There are no glands, stuffing boxes or spray nozzles. Pressure drop remains constant for all flows, and is normally 3 to 4 psig. Write for Bulletin 1037.



**The problem:** to maintain the temperature of residual fuel oil at 335°-380°F using station steam at 1250 psig and 950°F. Because of the high temperature heating requirements of the fuel, it was necessary to use the station steam supply. To handle this tough assignment a single, combination pressure-reducing and regulating valve, Copes-Vulcan Type CV-D, followed by the Copes-Vulcan Variable-Orifice desuperheater was used. The cooling-water valve is also a Type CV-D. The desuperheater provides steam at the right temperature to control the fuel oil temperature and viscosity exactly. It has been in service over two years with no downtime and no operating problems.

## *solves knotty problems at two generating plants*



**The problem:** to deliver 420°F steam at from 20,000 to 300,000 pounds per hour and within  $\pm 5^\circ\text{F}$  of the set point. Conventional desuperheating equipment could not be used because of the low superheat (30°F) and low flow conditions. A 12-inch, 300-psig standard Copes-Vulcan Variable-Orifice desuperheater, with outlet expanded to 20-inch pipe size, was the answer. The inlet is connected with the main steam-distribution header carrying steam at 220 psig and 500°F. The cooling-water supply is at 450 psig and 200°F. The specified pressure range is 425 to 475 psig. Cooling-water flow is automatically regulated by a Copes-Vulcan Type CV-D valve operated by a temperature controller in the steam heating supply line. Flow requirements at discharge temperature within  $\pm 5^\circ\text{F}$  have been met consistently though inlet temperatures vary from 520°F to 550°F.

Copes-Vulcan desuperheaters are designed for precise control of reduced steam temperatures under the most difficult operating conditions.

In addition to the Variable-Orifice, two other types are available. *The Carburetor-Type desuperheater* injects cooling water into the system with a spray nozzle. Available in standard 2-inch through 12-inch sizes in 150- through 600-pound pressure standard for cast steel. Larger sizes and higher pressure standards are available on special application. Write for Bulletin 1056.

*Steam-Assist desuperheater* has negligible permanent pressure loss on loads of 15% to 100% of maximum. This in-line desuperheater normally uses assisting steam only on light loads where control is most difficult. Write for Bulletin 1024-A, Copes-Vulcan Division, Erie 4, Pennsylvania.

*Copes-Vulcan Division*

**BLAW-KNOX**



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## NEW Product Briefs

... there is always a **BETTER WAY**

### FOR MORE INFORMATION ON FOLLOWING ITEMS Fill in Code Number on Return Card — Page 69

#### Forged Steel Strainer

**C-1** **Armstrong Machine Works.** Three Rivers, Mich., has announced a forged chrome moly steel strainer, designed for 2500 psi pressure at temperatures to



1050 F. It is suitable for 6000 psi at 100 F.

The strainer is available in two sizes and four pipe connections: 26 lb, ¾" or 1", and 56 lb, 1¼" or 1½". Socket weld connections are standard, including a socket weld blow-down connection.

#### Prefab Buildings

**C-2** **Butler Manufacturing Company,** 7400 East 13th St., Kansas City 26, Mo., recently announced the expansion and redesign of its entire line of rigid frame buildings. Both conventional roof pitch and low profile buildings are available in a number of different design loadings to meet building code requirements.

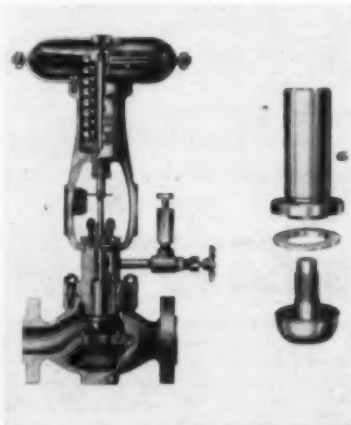
A 24 ft bay length replaces the previously standard 20 ft bay. A new Modular Wall System has been added to the two curtain walls offered by the company. New decorative and protective colors have been intro-

duced. Windows, ventilators, doors, and trim have been redesigned.

The company also has broadened its product line to include the "Wedge Beam" building, available initially in 24 ft and 48 ft wide modular units to answer construction needs when wide clear spans are not essential. "Wedge Beam" units may be incorporated to form buildings up to 336 ft wide with a single gable, a butterfly or folded plate roof-line; the units may be arranged to achieve an H-shaped, L-shaped or T-shaped structure. This construction concept also provides for easy expansion in any horizontal direction at some future date.

#### Soft-Seat Valves

**C-3** **Mason-Neilan, Div. of Worthington Corp.,** 25 Nahatan St., Norwood, Mass., has developed soft-seat plugs which provide tight shutoff without sacrificing flow characteristics or capacity for Masoneilan 20000 Series control valves.



Design of the plugs is such that there is metal-to-metal backup for the soft seat inserts which, in closed position, are fully retained and will withstand differential pressures in excess of 1000 psi.

Inserts of Buna-N, Teflon and Glass Filled Teflon are available.

All of the materials are long wearing, replaceable and interchangeable. The soft seat design is available in all Masoneilan 20000 Series control valves, sizes 1" to 10". By installing plug and ring sets, 20000 Series valves now in service may be converted to soft seat construction in the field.

#### Rotary Switches

**C-4** A new 20-amp addition to its line of modular design rotary switches is announced by **American Solenoid Co., Inc.,** U. S. Highway 22, Union, New Jersey. The unit can be employed



for motor control up to 16 hp at 600 volts, as well as for instrumentation and control circuits.

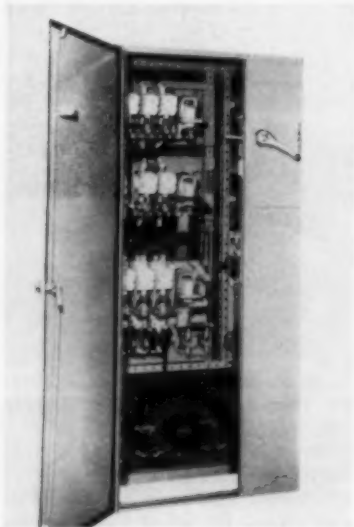
Designated as Type C-16, this switch contains two isolated double-break silver-alloy contacts in each stage. Twelve stages can be combined to form a single column of 24 contacts. Up to 4 columns arranged in tandem can be used in a switch assembly to control up to 96 double-break contacts over 18 positions, from a single control point. Contacts are cam operated, and a broad variety of contact arrangements is feasible.



## Reduced Voltage Starter

C-5

A size 6 autotransformer-type reduced voltage starter, which meets both JIC standards and NEMA requirements, is now offered by the **Westinghouse**



**Electric Corporation**, Box 2099, Pittsburgh 30, Pa.

The starter features an operating handle that is permanently attached to the circuit breaker to provide positive indication and control of the circuit breaker with the door either open or shut. This operating handle and door are interlocked to prevent opening of the door with the circuit breaker in the "on" position and to prevent closing of the circuit breaker with the door open. This size 6 reduced voltage starter also uses the new type GP 600-ampere a-c contactor, which features small size and front panel mounting and wiring.

## Suction Hose

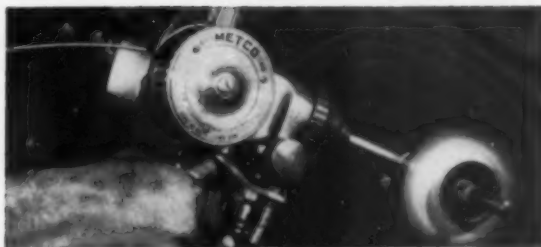
C-6

A water suction hose designed especially for use where hose is subject to damage from truck movements is being marketed by **The Goodyear Tire & Rubber Company**, Akron 16, Ohio.

Identified as "Rebound" because it springs back to its original shape even if completely crushed, the hose is produced in lengths to 50 feet and in one and one-half inch to three inch inside diameters.

The shape of the hose is maintained by a specially treated rope helix embedded in heavy rubber between two plies of fabric reinforcement. The helix also prevents collapse of the hose at high vacuum.

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Sprays any metal that can be drawn into wire form.

### POWDER GUN

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Thousands of large, well-known companies and shops have been metallizing users for many years, not only in maintenance work but in production applications on original equipment. Now, with modern low-cost metallizing equipment this high-speed "putting-on" tool is within the reach of even the smallest shop.



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## New Product Briefs (Continued)

### Heavy-Duty Valves

**C-7** Two new block steel valves for continuous, heavy-duty flow regulation applications have been added to the line of industrial instruments and regula-



tors produced by **McAlear Manufacturing Co.**, 1901 South Western Ave., Chicago 8, Ill.

These valves are specifically designed for such applications as continuous boiler (surface) blowdown systems, hydraulic service, instruments, throttling service, water column blowdown, soot blowers, boiler sampling service and flow control of volatile liquids.

Featuring a heavy design and extra thickness at all wear points, the valves are available in carbon steel or chrome-moly steel. Seats and discs are specially treated for surface hardness to Brinell 750 or Rockwell C70.

### Lube-Free Drive

**C-8** **Sterling Electric Motors, Inc.**, 5401 Telegraph Road, Los Angeles 22, California, has introduced a "Lube-Free" variable speed drive. The new drive, which never requires lubrication, solves many problems such as variable speed drive failures, pulley wear, sticky pulleys, shortened belt life, and excessive noise, caused by lack of proper lubrication.

Major components are shown in the photograph. Shaft surfaces are extremely tough; unusual chemical resistance and anti-frictional properties make an excellent load-bearing material operating under extremely

low or high temperatures. Keys and bushings are fabricated from a material having outstanding abrasion resistance.

All bearings, sealed and shielded, are factory lubricated. Shaft surfaces are impregnated with a special tough and wear-resistant material which eliminates need for lubrication. The non-metallic bushings are also made from a wear-resistant material.

The "Lube-Free" variable speed drives are produced in  $\frac{1}{4}$  hp to 25 hp, having output speeds from 4660 rpm to .4 rpm, in speed variations up to 10:1. All drip-proof, totally enclosed fan-cooled, and explosion-proof variable speed models are lube-free.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

### Compact Calculator

**C-9** **The Curta Company**, 14435 Cohasset St., Van Nuys, California, has introduced a new lightweight calculating machine for designers, engineers and technicians who require a precise "on-the-spot" answer.

Combining the accuracy, speed and versatility of a large desk calculator with the portability of a pocket slide rule, the Curta Type 2 has a



capacity of 11 digits on the keyboard, 8 digits on the indicator dial and 15 digits (corresponding to 999 trillion) in the answer dial.

### Expansion Compensators

**C-10** **Flexonics Corporation**, Bartlett, Ill., announces that its original Model H expansion compensator, designed to absorb thermal growth in pipes

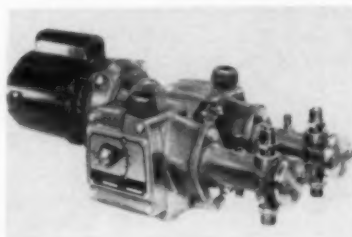


up to 3", is now available as Model HS, manufactured entirely of corrosion-resistant stainless steel.

Screwed, welded, or flanged ends; heavy-duty 2-ply bellows; positive anti-torque mechanism; and protective shroud are all of stainless steel. This permits use of this low-cost device under corrosive conditions, at working pressures up to 175 psi, temperatures up to 750 F. The unit is manufactured in pipe sizes  $\frac{1}{4}$ " to 3".

### Metering Pumps

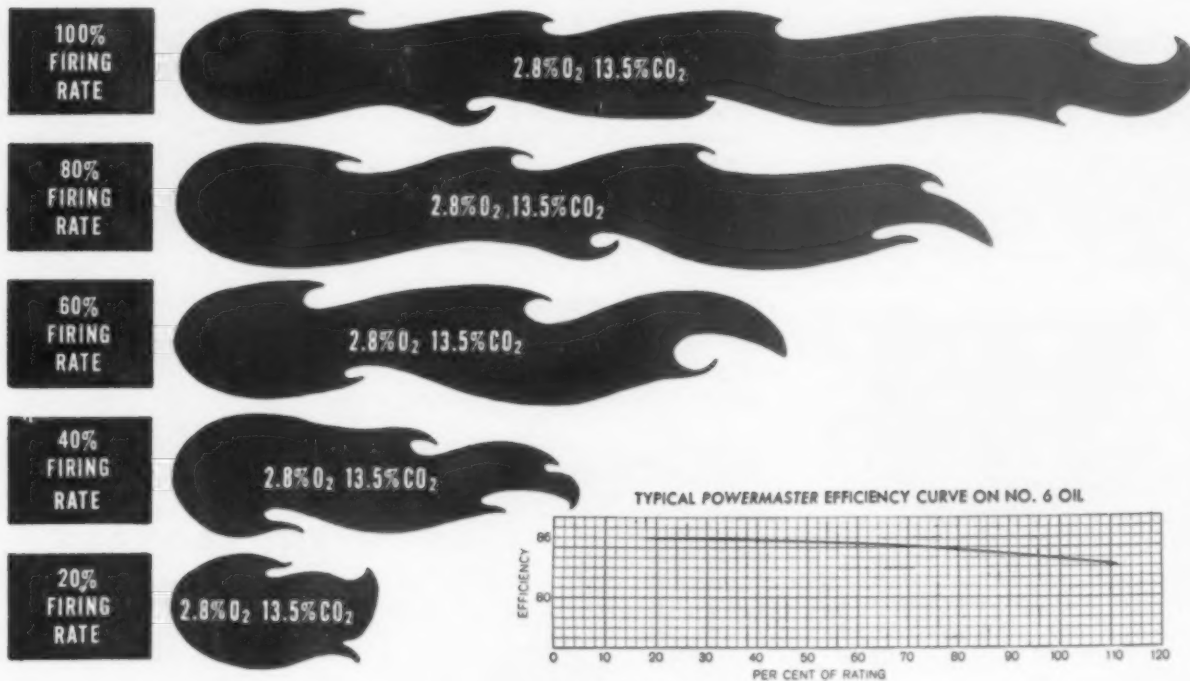
**C-11** **Wallace & Tiernan Inc.**, 25 Main St., Belleville 9, N. J., has added another model to its line of plunger metering pumps. The new Series 100 is the



smallest in the line, and is designed to give accurate, economical metering against pressures up to 1200 psi. Capacities range from .95 gph vs 1200 psi, to 50 gph vs 100 psi, at repeatable accuracies within  $\pm 1\%$ .

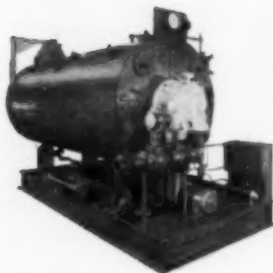
The pump is available with either one or two liquid ends. The second liquid end may be used either to double capacity, or for proportional blending of two liquids. The stroking length of either liquid end may be adjusted individually, while the pump is running or stopped, offering great flexibility in use.

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**Only *Powermaster*<sup>®</sup> gives you this type efficiency**

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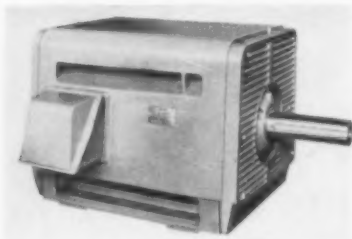
***Powermaster***  
PACKAGED AUTOMATIC BOILERS

## New Product Briefs (Continued)

### Compact Motors

**C-12** The Reliance Electric and Engineering Company, 24701 Euclid Ave., Cleveland, Ohio has developed a new design to reduce the overall size of large a-c motors.

The Duty Master D-5000 motor has a round stator inside its nearly



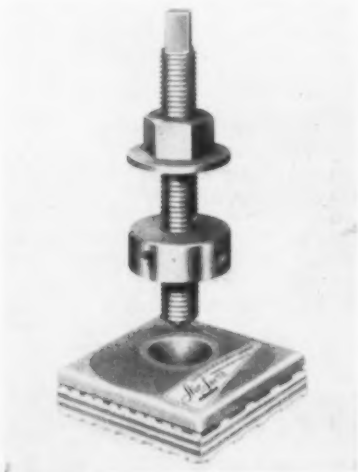
square frame. This unusual arrangement provides better cooling, permitting use of a smaller overall dimension for any given horsepower rating.

Either 220, 440, or 550 line voltages are available for 3600, 1800, 1200 and 900 rpm operation. A totally-enclosed fan-cooled design will be available soon, and horsepower up to 2000 will be ready in early 1962.

### Machinery Mount

**C-13** The Clark, Cutler, McDermott Company, Air-Loc Division, Franklin, Mass., announces an addition to its regular line of machinery mounts.

The new "Jacmount" consists of a cast steel base plate bonded to a



heavy pad of Air-Loc, and a leveling screw assembly. The mount will effectively dampen and isolate vibration as much as 85 per cent. The base plate and pad are only one inch high, assuring maximum rigidity of the mount and ease of installation.

### Actuator

**C-14** Fisher Governor Company, P. O. Box 307, Marshalltown, Iowa, has combined its pneumatically operated piston actuator with a rack and pinion to



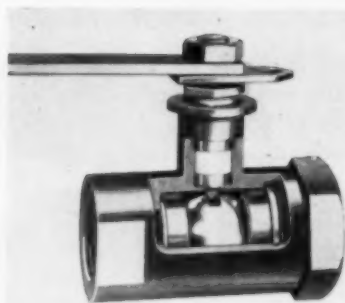
convert the linear motion of the piston rod to rotary motion. This actuator, the Type 487, then positions a rheostat in response to a pneumatic signal. It produces 185 inch-pounds of torque with 40 psig air supply.

### Ball Valves

**C-15** A line of ball valves in combinations of metals, seats and seals to handle practically any fluid, is announced by Homestead Valve Manufacturing Company, Box 348, Coraopolis, Pa.

Featuring adjustable stem seal, a self-adjusting ball which seals with flow in either direction, and stem shoulder to prevent ball from being forced downward, the line includes valves with Navy G bronze or semi-steel cast bodies; or brass, steel, and 303 or 316 stainless steel bar stock bodies.

Both the cast and bar stock types have full-round pipe-sized passage for fluids, or restricted passage as desired. Offered now with flexible



self-forming Teflon seats and seals, they will soon be offered in other materials such as: rubber, polyethylene, or Kel "F". Sizes range from 1/4" to 2 1/2" for pressures up to 400 pounds water-oil-gas, and temperatures to 450 F.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

### Dock Board

**C-16** A new, low cost dock board, designed to handle any truck, trailer or load, has been introduced by Hartman Metal Fabricators, Inc., 139 Main St., Waterloo, N. Y.



The "Retract-O-Matic" features a unique lip which extends up to 24" to permit accurate positioning for each truck and load.

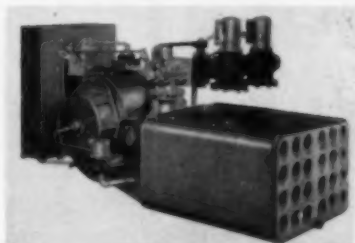
No attendant is required during positioning, which saves manpower and time. When ready to service the truck, the operator unlocks the dock board, allowing the deck to rise to the uppermost position, 14" above dock level. The lip is extended to the correct length for the truck and load. The deck then floats down and the lip rests on the truck bed. As the trailer is loaded or unloaded, the deck automatically rises or lowers with the truck bed, maintaining firm, positive contact at all times.



## Gas Burners

C-17

The "building-block" principle of component design has been applied to a new line of automatic motorized, mechanical-draft gas burners built by the **Mettler Co., Inc.**, Division of Eclipse Fuel Engineering Company, Rockford, Illinois.

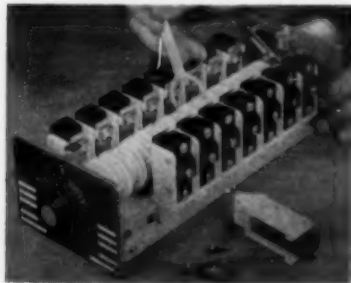


The "Custom Fan-Air" burners feature a selection of six burner sizes in fifteen burner assembly variations, providing capacities to 35,000,000 Btu/hr. The wide variety available in these numerous assemblies enables the users to specify burners to meet virtually any firing requirement. Variations permit burner selection to meet FM, FIA, and other code requirements and regulations. Burners are of the inshot type.

## Program Timer

C-18

**Cramer Controls Corporation**, Electromechanical Division, Centerbrook, Conn., announces the new Type 540 cycling timer.



The instrument provides timed-sequence control of up to 20 independent load circuits, allows user to choose any of hundreds of different cycle speeds from 1 second to 11 days. The ON and OFF points are independently adjustable for each circuit from 2% to 98% of full cycle time. The unit can be supplied with relay for single-cycle-and-stop operation or with two-speed cam shaft.

*Largest Merchant Iron Producer in U. S. Chooses*

# WHIRLEX ID FANS

**High Erosion Resistant  
Fan Wheel Assures  
Longer Life . . .  
Minimum Maintenance**

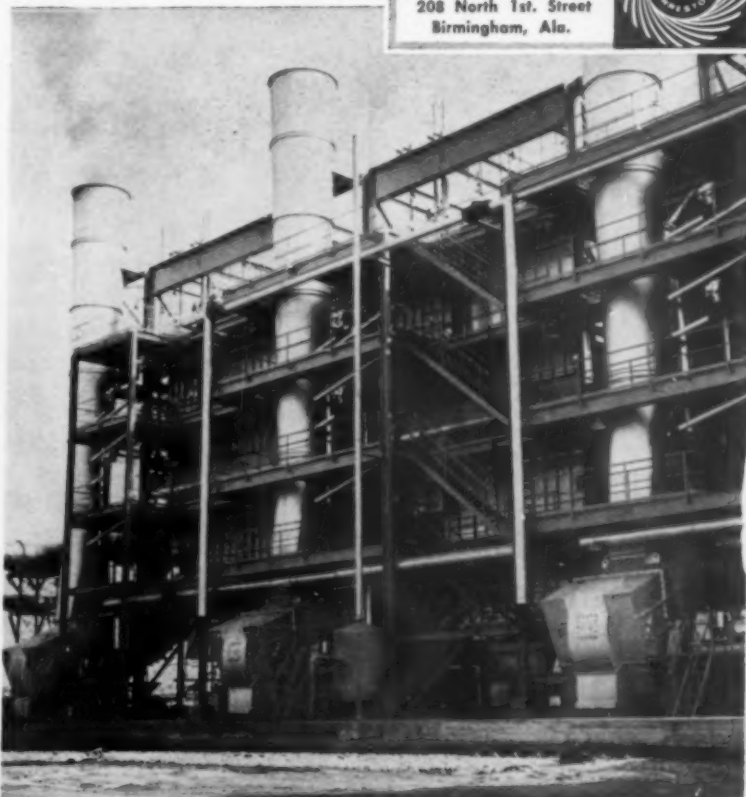
The largest furnace in the country producing merchant pig iron was recently placed in service as part of an expansion program by a major Southern mill. The new furnace has a rated capacity of 1000 tons per day and is one of the most modern in the country with respect to mechanization and automatic controls.

Because of their unique

design and high erosive resistance, WHIRLEX heavy duty induced draft fans were chosen to handle the hot blast furnace gas. The three units shown here carry approximately 150,000 cubic feet of gas per minute. Preliminary fan examinations show wear to be less than a third that of ordinary fans designed for this purpose.

*A Whirlex fan installation  
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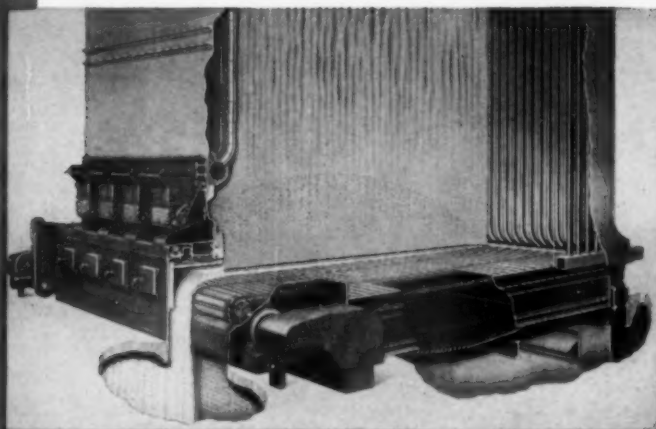


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Caterpillar Tractor Co.	Ohio State University
Central Illinois Electric and Gas Co.	Southern Colorado Power Co.
Chrysler Corp.	Southern Utah Power Co.
Ford Motor Company	Vinceland (N. J.) Municipal Utility Plant
General Electric Co.	W. Virginia Pulp and Paper Co., Inc.
General Motors Corp.	
Indianapolis Power and Light Co.	

\*Our agency to the many others not  
mentioned due to space limitations.

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**DETROIT ROTOGRATE STOKERS  
SERVE BOILERS AND STEAM GENERATORS  
WITH CAPACITIES OF UP TO 400,000  
POUNDS OF STEAM PER HOUR.**

<b>EFFICIENT</b>	Low combustible loss — Low excess air — More steam per pound of fuel.
<b>FLEXIBLE</b>	Handles widely fluctuating loads, easily, rapidly and without shaking.
<b>DEPENDABLE</b>	Exceptional availability records in all kinds of plants, year after year.
<b>VERSATILE</b>	Burns all grades of bituminous and lignite coals — Also many waste fuels.
<b>ECONOMICAL</b>	Practical design — Rugged construction for low maintenance.

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Atlanta 9, Georgia







# NEW Catalogs & Bulletins

... there is always a **BETTER WAY**

## MAINTENANCE—TOOLS EQUIPMENT & METHODS

**1—Emergency Chemical Cleaning** — 4 page catalog highlights Anco solvents and service trucks available to remove scale, rust and other deposits from all types of heat exchange equipment. — **ANDERSON CHEMICAL COMPANY.**

**3—Metallizing**—Use industry's low cost "putting-on" tool. Now within reach of the smallest shop. Bulletin tells how you can spray carbon steels, stainless, babbitts, brass, nickel, aluminum. — **METCO, INC.**

**4—Simplified Lubrication**—You may be using up to five times as many lubricants as you need; up to five times as many ordering, billing, handling, stocking problems. Booklets on Multipurpose lubricants show how you can cut maintenance costs and inventories. — **GULF OIL CORPORATION.**

**12—Lubricator Vacuum Type Pumping Unit**—If your plant is experiencing difficulty with visibility and excessive maintenance on lubricator sight glasses, the 82 vacuum pumping unit will offer lower cost. Form 1263 gives principle of operation and advantages. — **MANZEL.**

**14—Hose & Fitting Needs**—Complete Weatherhead line described in bulletins—flared, flareless, or pipe fittings; brass, stainless, carbon; pressures to 10,000 psi; sizes 1/4" to 2" O.D.; production or small maintenance quantities. — **DIESEL INJECTION SALES & SERVICE.**

**24—Roof Maintenance**—4 page catalog 5D describes Dri-N-Tite products for patching, priming and coating composition, corrugated or sheet metal, slag, gravel, concrete and felt roofs. — **A. C. HORN COMPANIES.**

**27—Corrosion Control Systems** — Brochure 9111 outlines five-step procedure for primary protection and preventive maintenance of all metal surfaces subject to acids, alkalis, solvents, fumes and gases. — **TRUSCON LABORATORIES.**

**53—Steam Line Treatment**—Folder describes alkaline IPCO S-L-T. Used in boiler water, it will volatilize and travel with steam to return lines. Prevents costly repairs and provides insurance against replacing pipe and fittings. — **IPCO, INC.**

**55—Better Tube Maintenance** — Catalogs describe how line of air-powered tools and accessories

(condenser cleaners, tube cutters, expanding brush head cleaners, etc.), are job-fitted to specific tube repair operations. — **AIRETOOL MANUFACTURING COMPANY.**

**77—Plant Health Aid** — Automatic footsprayer dispenses skin-toughening solution for prevention of athlete's foot. One gal of solution sufficient for 3,000 treatments. Catalog S-12 gives details. — **ONOX, INC.**

**84—Zinc Coatings** — Bulletin No. 4 describes Galvanox-Type II (Epoxy) a zinc-rich coating to be used as repair item for damaged areas on galvanized sheets and structures. Provides both cathodic type and barrier protection. — **SUB-OX INC.**

## FANS—PUMPS—COMPRESSORS HEATERS—HEAT EXCHANGERS

**100—Power Plant Pumps**—Bulletin BJP 58-8 covers complete line of standard pumps for power plant requirements — from 12,000 hp, doublecase boiler feed pump, to condensate, circulating and booster pumping duty. Also, special pumps for nuclear power plant installation. — **BYRON JACKSON PUMPS, INC.**

**107—Proportioning Pumps**—4 page brochure illustrates and describes proportioning pumps and package chemical feeding units. Includes applications and specifications. — **THE BIRD-ARCHER CO.**

**110—Deserator** — Bulletin 4651 describes design that eliminates tubular vent condensers without impairing efficient purging of non-condensable gases. Unit handles wide range of operating conditions. — **COCHRANE DIV.**

**112—Airfoil Bladed Fans** — Series 116, Centrifugal Type for broad range of general ventilation and industrial process applications from Class I through Class III with lowest possible first cost. Bulletin A-1103, 60 pages, gives engineering details. — **AMERICAN-STANDARD INDUSTRIAL DIVISION.**

**122—Industrial Fans**—Bulletin 702 covers Type XL fans for air and material handling. Volumes to 130,000 cfm pressures to 18" SP. Catalog 855 describes Pressure Fans. Volumes to 12,000 cfm, 10" to 50" SP. — **CLARAGE FAN CO.**

**154—Chemical Feeders**—Bulletin 202, 4 pages, illustrates and describes the Ful-O-Feeder chemical system for continuous heavy duty service. — **FULBRIGHT LABORATORIES, INC.**

**163—Storage Water Heaters** — Gas-fired, Scalefree 230 units described in Bulletin 4. Fully automatic package requires only simple connections. Available in more than 100 storage and recovery combinations ranging from 250-4,000 gal. — **THE PATTERSON KELLEY CO.**

**165—Heat Exchangers**—Bulletin 120 illustrates function of new equipment to provide cooling of liquids in industrial plants. Air-cooled heat exchanger, which is independent of large supply of cooling water, provides additional savings of installation and operation expense. — **NI-AGARA BLOWER COMPANY.**

## INSTRUMENTS—METERS CONTROLS—REGULATORS

**205—Draft Gages** — Bulletins describe inclined, vertical tube, air filter gages, straight line and dial pointer type, minified draft and receiver type gages, velocity gages and pitot tubes, gas analyzers and steam calorimeters. — **ELLISON DRAFT GAGE CO., INC.**

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**207—Control Centers & Systems** — Combustion safeguard and automation packaged control centers insure full coordination of complete system, place responsibility on one source, insure correct wiring, and reduce field labor. Catalog C11 illustrates variety of designs and circuits now in use. — **WEBSTER ENGINEERING CO.**

**211—Butterfly Valves**—Folder supplement to Catalog 307 stresses flexibility in valve line for controlling large volumes of liquids or gases. Valve actuators, special arrangements, shaft extensions, and electric actuators and positioners are featured. — **MASON-NEILAN.**

**212—Self-Powered Controls** — Bulletin 620 describes self-powered automatic temperature regulators — no compressed air or electrical wiring required, no delicate mechanisms to adjust, no packing glands to stick, no shut-down due to power failure. — **SARCO COMPANY, INC.**

**STOP**

# athlete's foot with **ONOX**<sup>®</sup> skin toughener



Footsprayer cuts cost to 1/10 cent per treatment.



One treatment with footmat costs about 1/5 cent.

Skin specialists say the best way to prevent Athlete's Foot is to increase the skin's resistance to fungus growth\*. That's what Onox does. It keeps your feet as tough and healthy as your hands. Used by clubs, schools, and over 70% of the largest U. S. companies for the treatment and prevention of Athlete's Foot.

\*American Pub. Health Assoc., Oct. 15, 1954

## ● TRY ONOX 60 DAYS AT OUR RISK

If not satisfied, you owe us nothing. Full details on request.

## ● FREE FOLDER

Write for "Facts on Athlete's Foot" including medical opinions.



## Bulletins (Cont.)

**224—Feedwater Regulator**—Bulletin 1044 describes the BI Feedwater Regulator, the single-element unit employing a thermostatic-tube level controller which actuates a regulating valve in feed line. For loads from 10 to 785 psig. Includes specifications table and schematic diagram. — COPES-VULCAN DIV.

**228—Fuel Cut-Outs & Water Level Alarms** — Brochure D2 — Electrode type equipment for installation on water columns to provide fuel cut-out, high and low water level alarms and pump cut on and off. For pressures to 2500 psi. — RELIANCE GAUGE COLUMN CO.

**235—Liquid Level Gauges**—Bulletin 463A describes automatic remote reading systems for nearly any liquid. Features include easy to read dial indication. — LIQUIDOMETER CORP.

**246—Desuperheater**—Product Specification M55-1 describes design, installation, and typical application of high capacity, fast acting spray type steam desuperheater.—BAILEY METER CO.

**255—Temperature Regulators** — "Sliding Gate" units are simple, low cost, self-operating, automatic control valves for heating or cooling applications. Action easily reversed by rotating seats 180°; self-powered —no electricity or compressed air needed; easy to install. Bulletin J-180-1 describes ten standard ranges from 35-450 F.—OPW-JORDAN.

**256—Boiler Control**—On-the-job report of Carolina Power and Light Company's Louis V. Sutton plant in Bulletin 1032. Features: combustion, feedwater, boiler feed pump re-circulation controls plus automatic sequential soot blowing.—COPES-VULCAN DIVISION.

**267—Remote Liquid Level Indicators** —Bulletin RI-1825 describes indicators for pressures up to 3000 psi —advantages, operation and specific installations.—YARNALL-WARING COMPANY.

**279—Instrument & Control Panels**—16 page Product Specification G71-7 gives details of construction, dimension, weights, instrument mounting, and accessories for 6 standard styles of instrument and control panels. — BAILEY METER CO.

**287—Color-Port Water Gage**—Bulletin WG-1814 describes the new gage for high pressure boilers (up to 3300 psi). Gives full details on design and operation and shows how it gives greater visibility and greatly reduced maintenance requirements. —YARNALL-WARING COMPANY.

**295—Two Fuel Cut-Out Controls in One**—Float operated and electrode operated fuel cut-out functions contained in one device. Bulletin D2.5 describes convenient optional

hook-up possibilities, for pressures to 350 psi. — RELIANCE GAUGE COLUMN CO.

## PLANT CONSTRUCTION—WELDING EQUIPMENT—SPECIALTIES

**304—Backing Rings** — Bulletin 56-2 describes rings for fast economical fit-up in piping, tubing, fittings and valves. Shows how rings assure uniform complete-penetration welds and ease of handling in shop and field. Carbon steel, wrought iron, chrome alloys, stainless, aluminum and copper.—ROBVON BACKING RING CO.

**309—Fiberglass Panels** having 20-year guarantee on panel color and light transmission characteristics are lowest-cost glazing you can buy on cost-per-year basis. Stylux-20 is shatterproof; provides up to 90% light transmission; does not pit or erode. Use for windows, skylights, sun shades, etc.—BUTLER MANUFACTURING COMPANY.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

**316—Drainage & Construction** — Catalog Gen-10658 gives data on products for industrial uses, including corrugated metal pipe, paved-invert pipe, Asbestos-Bonded pipe, Multi-Plate pipe, pipe arches, perforated pipe, and water control gates. —ARMCO DRAINAGE & METAL PRODUCTS, INC.

**324—Painting New Plants** — "Plan Painting of New Plants to Reduce Costs" describes how lead-suboxide paints can save 1 or 2 coats of paint on new plants. Eventual repainting costs are cut as well since these paints form a dense, metallic lead film which can be recoated without expensive scraping, sanding or repriming.—SUBOX INC.

**325—Water Storage**—The Cylindroid, a functional design for large-volume, low-cost, ground-level water storage described in 4 page catalog. Light steel construction, and smaller field erection crew are among savings over standard ground-level tanks.—GRAVER TANK & MFG. CO., INC.

**332—Heat Transfer Equipment**—If you have material to liquefy, heat, vaporize, superheat, condense, cool or solidify, check Bulletin HE-8 describing exchangers designed for temperatures as low as minus 160 F and as high as 1600 F with pressures ranging from vacuum to 9500 psi.—HENRY VOGT MACHINE CO.

**342—Power Roof Ventilators** — Bulletin 550 describes V-belt driven centrifugal type power roof ventila-

tors. Pressures to 2" SP; capacities from 1500 to 26,500 cfm.—CLARAGE FAN CO.

**370—Industrial Fence** — You can eliminate pilferage, control traffic, and improve plant appearance most economically with Anchor Chain Link Fences. Catalog gives case studies from other plants in South-Southwest. — ANCHOR FENCE.

**386—Rigid Frame Buildings**—8 page bulletin "Dixisteel Rigid Frame Buildings" — low cost, flexibility of design, durability, and minimum maintenance; also triangular or bow-string truss all-steel roof systems; fabricated for rapid erection. — ATLANTIC STEEL COMPANY.

**390—Tank Insulation** — An uninsulated tank is like a giant radiator heating the outdoors — and that costs money. 8-page Ultralite Tank Brochure tells you how you can save over 90% of this heat loss with glass fiber blankets. Can pay for itself in six months to a year. — GUSTIN-BACON MFG. CO.

#### PIPING—VALVES—FITTINGS STEAM SPECIALTIES—TRAPS

**401—Steam Traps** — Bulletin 775 gives price, dimension and capacity data on Open Float and Thermostatic Steam Traps for trouble-free heating service.—ARMSTRONG MACHINE WORKS.

**402—Forged Steel Valves**—General Purpose Valves, Supplement No. 1 to Catalog F-9, covers gate, globe and angle valves, ½" through 2" sizes, for 150-800 pound service. Featuring 13% chrome stainless steel trim with hard facings. — HENRY VOGT MACHINE CO.

**403—Valve Operators**—Folder shows how re-designed sprocket rim makes any valve readily accessible from the floor. Simplifies pipe layouts, prevents accidents, fits all valve wheels. — BABBITT STEAM SPECIALTY CO.

**406—Blow-Off Valves**—Unit-tandem valves for boiler pressures up to 665 psi described in Bulletin B-435. Tells how to specify and how to order.—YARNALL-WARING COMPANY.

**408—Wide-Range Valves** — Data Sheet 10-5 covers the "Point 4 Factor Trim" — answer to those few types of applications where reduced capacity trim is desirable. Available in V-port and solid turned designs for double or single seated valves and in wide variety of materials.—MASON-NEILAN DIV.

**409—Lubricated Plug Valves**—Catalog PV-4 covers operational features. Quarter-turn to open or close; lubricant grooves provide positive seal when valve is closed; when open, seating surfaces not exposed.—THE WM. POWELL COMPANY.

**410—Flexible Connectors**—How all-metal connectors absorb piping vibration described in Catalog 1D-

100C. Convey corrosives, simplify misaligned hookups, and save installation time. Bronze, carbon steel and stainless steel. — UNIVERSAL METAL HOSE CO.

**411—Steam Trap Book** — 48 page manual reviews importance of good trapping. Gives complete data on traps and strainers. Contains complete selection, installation, testing and maintenance information. Many useful tables and charts. — ARMSTRONG MACHINE WORKS.

**414—Acid Resistant Pipe** — 4 page technical brochure covers properties of Union 20-S stainless steel. Alloy can be welded and put into service without subsequent annealing. Shows comparative resistance to 94 different corrosive agents.—REYNOLDS ALUMINUM SUPPLY CO. — UNION STEEL CORP.

**17—Welding Fittings**—Seamless and welded fittings featured in Bulletin 60-C. Features industry's most complete line of directional changes, branch connections, flanges and special types.—MIDWEST PIPING COMPANY.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

**425—Steam Trap** with only three parts — cap, disc and body described in Bulletin 257. No valve closing mechanisms. Only moving part is solid stainless steel disc. Same trap for all loads and pressure 10-600 psi. — SARCO COMPANY, INC.

**443—PVC Fittings & Flanges**—Corrosion resistant polyvinyl chloride pipe fittings and flanges covered in 12 page catalog, featuring characteristics, advantages, limitations, operating pressures, temperatures and field tests. — GRINNELL COMPANY, INC.

**452—Pipe and Tubes**—42 page Bulletin 26 gives types of steel tubes, tensile, creep and rupture properties, welding and forming data, applications and other valuable information. — National Tube Div., UNITED STATES STEEL CORP.

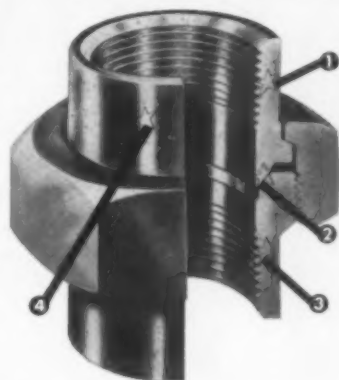
**458—Stainless Valves**—Catalog gives complete technical data on stainless steel valves for all purposes. Over 100 valves diagrammed and described.—REYNOLDS ALUMINUM SUPPLY CO. — COOPER ALLOY CORP.

**487—Power & Process Piping**—Offering you single responsibility, specialized service, integrated facilities for all piping, Catalog 60B highlights erection, fabrication and welding fittings details. Case studies from the South-Southwest. — MIDWEST PIPING COMPANY.



# only CATAWISSA

*gives you all these  
features for your  
forged steel pipe  
union requirements*



1. Uniform walls for even expansion and contraction under temperature changes. They follow the pipe!

2. Catawissa Ball-to-Angle Seats give you a "Perfect Seal" regardless of pipe alignment!

3. More than adequate wall thicknesses give you Catawissa's 3-to-1 Safety Factor (3000-lb. service, 9000-lb. test; 6000-lb. service, 18000-lb. test)!

4. Round, straight barrels for fast wrenching. No uneven or tapered surfaces to cause wrench slips or wrench locking!

Catawissa Perfect Seal Pipe Unions are made by Union Specialists from 80,000 lb. tensile strength steel (ASTM Spec. A-105-55T, Grade II). Steel forgings from our own forging mill are closely checked for imperfections . . . and finishing on modern, automatic machines with close inspection during and after production give you pipe unions second to none!

Write for Catalog 60 showing the complete Catawissa line of Perfect Seal Products.

*for complete, guaranteed satisfaction*

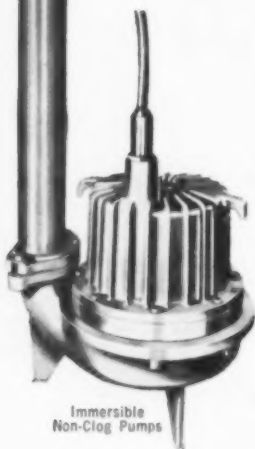
*... always specify  
CATAWISSA*

**CATAWISSA VALVE & FITTINGS CO.**  
CATAWISSA • PENNSYLVANIA



# here's why **most plant engineers prefer WEINMAN PUMPS**

Handling of liquids . . . for heating, cooling and processing . . . is an important facet of modern manufacturing. The tremendous volume of fluids handled prompts today's industrial engineer to find ways of insuring a steady flow of vital liquids to and from the job. That's why more and more engineers are turning to Weinman to meet their precise pumping requirements. And, they find plenty of reasons to back their buying decision:



Immersible  
Non-Clog Pumps

- 1 **WEINMAN EXPERIENCE.** More than 50 years of pioneering developments that are today's standards assures you of the right pump for each job.
- 2 **COMPLETE PUMP LINE.** Every type of centrifugal pump to meet any pumping need. You're sure that the pump you buy is the best pump for the job.
- 3 **QUALIFIED RECOMMENDATIONS.** Made after a careful analysis of your present and future pumping needs. You get the pump that fits your job today and tomorrow.
- 4 **SIMPLE DESIGN AND RUGGED CONSTRUCTION.** Weinman Pumps are built for easy maintenance and long, trouble-free service.
- 5 **INSTALLATION AND SERVICE.** You get skilled assistance before, during and after installation to insure proper operation twenty-four hours a day.

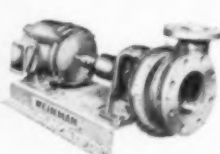
When you're faced with a pumping problem . . . get the right answer from your Weinman specialist . . . you'll find his name in the Yellow Pages. Or, write to us.



General Service  
Unipumps



Split Case,  
Multi-Stage Pumps



Single Stage,  
End Suction Pumps

**WEINMAN PUMP MFG. CO.**  
THE 290 SPRUCE STREET COLUMBUS 15, OHIO  
CENTRIFUGAL SPECIALISTS

## Asphalt & Oyster Shells For Roofing — Florida

Culminating nearly 11 years of research by an engineering team at the University of Florida, two Florida materials — asphalt and oyster shells — offer a promising potential in giving the roofing and road-building industries an economic shot-in-the-arm.

Two chemical engineering professors, H. E. Schweyer and Mack Tyner, have found that asphalt, a by-product of the Sunniland oil field in Collier County, and oyster shells from coastal regions, are a durable combination for roofing and road purposes. Their research showed that the mixture produces a material of good durability, and this is attributed to the ground oyster shells which are said to provide a long life for the asphalt. The effect is thought to be due partially to formation of tough coating on the outer surface of the material, which resists erosion and weathering.

To prove the product, exposure tests begun in 1948 were made by placing aluminum panels coated with the heated asphalt mixtures on a flat roof elevated 30 degrees from the horizontal and faced south for maximum average sunlight intensity. Life of the exposed coatings tested ranged from 2 to 10 years. The oyster shell mixtures resisted weathering for about 8 years and were superior to some commercial products.

The results of the University's long research have demonstrated that excellent products can be made with Florida (Sunniland) asphalt and oyster shell fillers, both of which could be produced commercially.

## MECHANICAL ENGINEER WANTED FOR PLANT ENGINEERING DEPT.

Graduate Mechanical Engineer with Power Plant experience to work as Utilities Engineer in Plant Engineering Department of large Pulp and Paper Mill. Job will consist of engineering assignments of additions, alterations, replacements, changes, and studies necessary to upgrade and improve operation of plant utility equipment. Job will require close coordination with power plant operation personnel. Age 25-35. Send complete resume to: Personnel Manager, SCOTT PAPER COMPANY, Box 1189, Mobile, Alabama.



# POWELL PERFORMANCE PAYS OFF

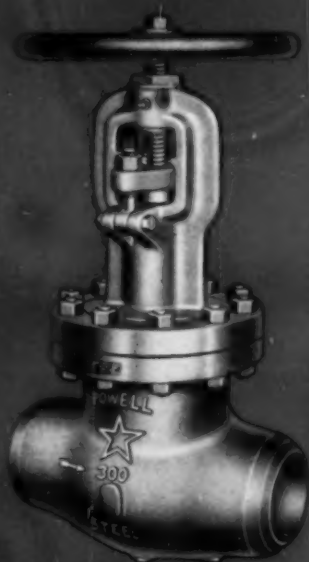
Any way you look at it, Powell Valve performance really pays off—performance that's conclusively proven in power plants everywhere.

You can find at Powell any type of valve you may need to handle water, oil, gas, air, steam, corrosive fluids, even molten metals and other radioactive materials used in atomic power plants.

Consequently, Powell can help simplify flow control

projects and contribute real savings in time and money. For example, in describing a modern 125,000-KW steam-electric generating plant, a leading authority recently listed some 80 areas requiring a total of over 1300 valves . . . Powell could have supplied almost every one.

Learn how this Powell performance can mean a real payoff for you. Contact your nearby Powell Valve distributor, or write direct.



300-pound Steel Globe Valve with welding ends. Outside screw rising stem and yoke. Bolted flanged bonnet. Screwed-in seat ring. Sizes, 1" through 12". Screwed or flanged end valves are available.



600-pound Steel Swing Check Valve with welding ends. Bolted flanged cap. Disc hung on a 5° angle allows full flow through when wide open. Screwed-in seat ring. Sizes, 1/4" through 8". Can be furnished with flanged or screwed ends.



150-pound Steel Gate Valve with welding ends. Outside screw rising stem and yoke. Bolted flanged bonnet. Solid wedge disc, screwed-in seat rings. Sizes, 1/4" through 30". Can be supplied with screwed or flanged ends.

*115th year of manufacturing industrial valves for the free world*

**POWELL STEEL VALVES**

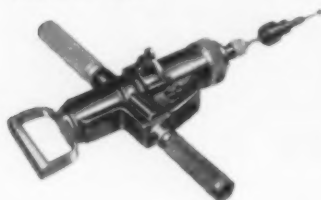
THE WM. POWELL COMPANY CINCINNATI 22, OHIO





## AIRETOOL CUTS COSTS... KEEPS TUBULAR EQUIPMENT IN TOP SHAPE

Airetool pneumatic tools are designed to stand up under rough conditions and to function with complete accuracy at low cost.



One man using air-powered AIRETOL rolls twelve 1/4" to 1 1/2" OD tubes every minute. Automatic expansion control provides expansion within .001" accuracy. Convenient hand throttle, quick change chuck and light weight make Airetool easy to handle. Electrically operated systems available for large tubes.



CC-475 Cleaner removes tough deposits fast. Built-in flushing system cools drill and flushes chips. Weighs just 10 pounds. Accessories available. Complete line of air-powered direct-drive and geared tube cleaners.

..... Other Airetool equipment includes: Internal Tube Cutters, and cleaning heads for straight and curved tubes. Airetool also makes a complete line of air-driven grinders and production tools. For complete information and an in-plant demonstration, write



Representatives in principal cities of the free world.

## Bulletins

(Continued from page 73)

**493—Unions & Swing Check Valves** — Engineering data, sizes, weights and dimensions on Perfect Seal Pipe Unions and Swing Check Valves featured in 20 page Cat. 60. Also includes Gasketless Cup-Orifice Unions and Ductile Iron Check Valves. — CATAWISSA VALVE & FITTINGS CO.

### BOILERS—STOKERS BURNERS—FUELS

**502—Feedwater Treatment**—4 page catalog tells how Braxton and Flako internally condition water to remove and prevent scale formation and corrosion in boilers.—ANDERSON CHEMICAL COMPANY.

**507—Packaged Water Tube Boilers** —Descriptive catalogs detail 10 outstanding features including six-wall furnace cooling, insulated double-steel casing, manway in every drumhead, and tangent tubing providing "solid walls of water" on four sides of furnace. — SPRINGFIELD BOILER COMPANY.

**509—Free Coal Counseling** — General information on how Coal Bureau engineers will advise on selection, transportation and utilization of the right coal for your purpose.—NORFOLK AND WESTERN RAILWAY CO.

**515—Packaged Steam Generators** — Bulletin PSG-2 describes factory assembled portable type units from 10,000 lb/hr to 40,000 lb/hr capacities. Gives construction details and dimensions. In standard pressures of 175, 250 and 375 psi. — HENRY VOGT MACHINE CO.

**516—Fuel Savings**—How the packaged Ljungstrom air preheater boosts performance and offers fuel savings for small boilers and process applications is highlighted in 14-page Bulletin. Boiler as small as 25,000 lb/hr can have advantages of regenerative preheating — saves fuel, boosts output, and permits use of lower grade fuels.—THE AIR PREHEATER CORPORATION.

**536—Automatic Boiler-Burner Unit** —Assembled plant (Scotch-type, two-pass) for all heat or power applications, low pressure or high pressure: burner to match for heavy oil, light oil, or combinations of gas/light or gas/heavy oil. Easy maintenance. Bulletin SPI-100. — INDUSTRIAL COMBUSTION, INC.

**537—Waste Heat Boilers**—Economic utilization of excess heat from diesel exhaust gases and from industrial and chemical processes described in Bulletin WHB-47-4. Bare tube and extended surface designs of varying capacities and applications covered. — FOSTER WHEELER CORPORATION.

**542—Underfeed Stoker** — Illustrated Cat. 401 gives complete data on double retort underfeed stoker built

for heavy duty service in intermediate size range for boilers of 20,000 lb to 34,000 lb of steam/hr capacity.—DETROIT STOKER CO.

**551—Packaged Water Tube Boilers** —Complete data and dimensions for boilers ranging from 8,000 to 50,000 lb/hr, firing oil or gas or both, described in 12 page Catalog 111-D.—SUPERIOR COMBUSTION INDUSTRIES, INC.

**553—Boiler Start-Up** — Bulletin 1048 describes a moving temperature probe which patrols critical boiler gas passages and warns of incipient hot spots during lighting off. Includes structural details and specifications of probe as well as explanations of operating features and methods of control. — COPES-VULCAN DIVISION.

**557—Coal** — Current brochure on "Prescription Coals." — A. T. MASSEY COAL CO., INC.

**567—Boiler Equipment** — New data on steam generators in sizes to 500,000 lb/hr, for high or low steam pressures and temperatures, for all types of fuel and firing methods. — WICKES BOILER CO.

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

**570—Seamless Boiler Tubes** — 44 page Bulletin 12 contains complete description of manufacture, advantages, tolerances, allowable stress and working pressures, bursting strength, weights, steam properties and other data.—NATIONAL TUBE DIV., UNITED STATES STEEL CORP.

**574—Packaged Generator**—Bulletin 582 describes Vapormatic Coil-N-Shell Steam Generator for service requirements of 5 to 150 psig. Gives operation features and specifications. Available with gas, oil, and combination gas/oil fuel systems.—TEX-STEAM CORP.

**587—Coal-Fired Packaged Boiler** — The new semi-automatic stoker-fired unit available in standard sizes of 43,000, 50,000 and 63,000 lb/hr, described in Bulletin PG-59-4. Performance characteristics, line drawings, and photos included.—FOSTER WHEELER CORPORATION.

**590—Packaged Rotary Burner**—Fully automatic Roto-Pack forced draft units described in Bulletin: 6 sizes, 7 types to fit all automatically fired boilers or furnaces. Burn all grades of fuel oils, gaseous fuels or combination of both.—TODD SHIPYARDS CORPORATION.

**594—Packaged Boiler** — Ten outstanding features of new positive flow model in 5 sizes (50-100 hp) include ease of operation and accessi-

bility. Bulletin 1275 gives engineering details. Oil-gas and combination fired. New burner design.—ORR & SEMBOWER, INC.

**ENGINES—DRIVES  
POWER TRANSMISSION  
MATERIAL HANDLING**

**600—Mechanical Shaft Seals**—Chempro mechanical external seal described in Bulletin CP-551. First seal designed for complete interchangeability with packing. No mounting clamps, machinery stuffing box faces or drilling holes. Install in 30 min. Adjust after installation.—CHEMICAL & POWER PRODUCTS, INC.

**605—Cranes & Hoists** — Production moves faster, more efficiently and you increase usable storage space with Job-Mated cranes and hoists. Bulletin gives the right combination of capacity, clearance, speed, controls and components to handle each job best.—SHEPARD NILES CRANE AND HOIST CORP.

**606—Retaining Ring Kits**—400 Tru-arc cadmium plated rings — 84 sizes in one economy kit. Sizes from ¼ to 2½ in. in three most used series of internal, external and universal crescent ring designs — \$34.50 per kit.—DIXIE BEARINGS, INC.

**607—Crane Systems** — Booklet 2008, profusely illustrated, shows how Tramrail transfer cranes can systematize handling; engineering and application data. — CLEVELAND TRAMRAIL DIV.

**616—Gas Fork Trucks**—Extremely maneuverable, easy-to-operate trucks described in catalog. Standard full capacity lifts up to 144" — higher lifts available. Pneumatic-tire models for rugged indoor-outdoor work. — BAKER INDUSTRIAL TRUCKS DIV.

**627—Variable Speed Fluid Drives** for blowers, fans, pumps, compressors, etc., detailed in 20 page Bulletin A-719. Features of the Gyrol fluid drive include no load starting, power savings, simpler and better control. — AMERICAN-STANDARD INDUSTRIAL DIVISION.

**644—Elevator Maintenance** — How Otis contract maintenance service keeps equipment operating like new outlined in 24 page catalog. Preventive maintenance corrects one fault before one fault can cause another. — OTIS ELEVATOR COMPANY.

**651—Bearing Aluminum Bars**—Aluminum bearings can replace bearings of other metals which cost twice as much. No sacrifice in performance or life. Catalog 46 covers composition, machining and use. — THE BUNTING BRASS AND BRONZE COMPANY.

**653—Pulverizers** — Planetary role and table units for coal, limestone, gypsum, solid chemicals, food products and other materials described in Bulletin MB-58-1. Capacities

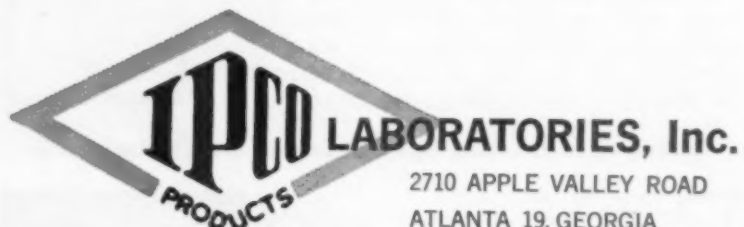


## *IpcO Service will keep it clean!*

The boiler shown above was cleaned by IpcO Laboratories, and serves one of the South's largest railroads.

IpcO maintenance service will continue to keep it clean so that scale build-up will not recur...

Call CEdar 3-4162, Atlanta, Georgia, collect



2710 APPLE VALLEY ROAD  
ATLANTA 19, GEORGIA

Member of Associated Laboratories, Inc.

# This green liquid column could be your boiler water level -



## a true check on your boiler's safety by the Reliance EYE-HYE

Easy to read, like the conventional boiler gage, the illuminated green fluid gives you even sharper indication of where water levels stand. EYE-HYE can be placed at any vantage point, on panel, post or wall. Manometric operating principle insures perfect measurement, sensitive to slightest level changes.

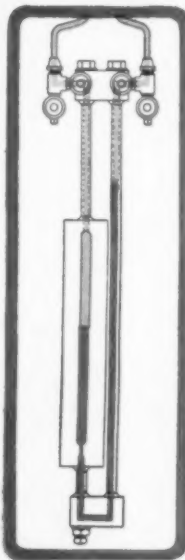
Easy to install, easy to maintain. With no mechanical working parts to fail - no gears, magnets, diaphragms or linkage - it's simple, fool-proof. No adjustments. Each EYE-HYE is factory-calibrated to your water level range and working steam pressure.

Various EYE-HYE models fit any remote gage need - for boilers, tanks, storage vessels - any visibility length, any working pressure. Wide vision facility makes reading visible from wide area . . . For safe, sure check on boiler water levels, write the factory for full EYE-HYE information.

The Reliance Gauge Column Co. • 5902 Carnegie Ave., Cleveland 3, Ohio

# Reliance®

BOILER SAFETY  
DEVICES



## Bulletins (Cont.)

from 2 to 55 tons of pulverized material per hour.—FOSTER WHEELER CORPORATION.

### WATER TREATMENT—HEATING & AIR CONDITIONING—DUST & FUME CONTROL—REFRIGERATION

**700—Peak Load Problems?** — Keep your air conditioning and refrigeration systems operating at maximum efficiency during peakload months. Catalog tells how Anco treatment removes rust and scale and kills slime and algae in equipment. — ANDERSON CHEMICAL COMPANY.

**701—Exhausting Corrosive Fumes** — Bulletin 702-A shows how corrosive fumes can be exhausted with rubber, lead lined or specially coated fans. — CLARAGE FAN CO.

**703—Industrial Air Conditioner** — Bulletin 122 describes methods to obtain control of air properties with accuracy of 1% in R.H. and 1 F in temperature (up to 140 F dew point) with compact high capacity apparatus. Entirely independent of the use of moisture-sensitive instruments.—NIAGARA BLOWER COMPANY.

**704—Water Conditioning** — Brochure describes company's engineering services — zeolite water softeners, filters and purifiers, aerators and degasitors and process and boiler water conditioning. Rebuilding and Modernizing Service.—SOUTHERN WATER CONDITIONING, INC.

**706—Centrifugal Blowers & Exhausters** — Catalog ACB-104 covers units providing uniform air pressure up to 10 psi, or vacuum up to 12-in. of mercury. Volumes to 20,000 cfm. Line provides clean, dry air or gas at constant pressure for many processes.—U. S. HOFFMAN MACHINERY CORPORATION.

**709—Purer Process Water** — Data tells how Ferri-Floc (ferric sulfate) can help you with coagulation and softening, removal of iron and manganese and other water purification problems.—TENNESSEE CORPORATION.

**711—Refrigeration Condensers** — Bulletin RC-2 shows how Vogt condensers step up rate of heat transfer and step down head pressures. Closed type for clean water; film type where water is hard and forms scale. Units save power and refrigeration cost.—HENRY VOGT MACHINE COMPANY.

**713—Electric Precipitators**—26 page Bulletin 104 shows how units meet five engineering requirements —Positive control of gas flow; high, uniform electrode emission; effective continuous cycle rapping; and safe, trouble-free high voltage equipment. Gives 9 steps to successful installation.—BUELL ENGINEERING COMPANY, INC.



**724—Chemicals & Services** — Water treatment chemicals and engineering services for The Industrial South-Southwest highlighted in 12-page Bulletin 5000-A. Specific products and their functions detailed. — **DEARBORN CHEMICAL COMPANY.**

**726—Filters** — Automatic valveless gravity filter described in 8-page Bulletin 4351. Includes design features and installational details. — **PERMUTIT.**

**730—Hydrazine** — Bulletin BW 8, 10 pages — Discusses chemical reduction of oxygen in boiler feed-water with Deoxy-Sol, a 35% aqueous solution of hydrazine. Gives flow diagram; covers handling and storage; includes bibliography. — **FAIRMOUNT CHEMICAL CO., INC.**

**733—Air Handlers** — Technical bulletins describe air handling units 665-47,000 cfm capacity. — **ACME INDUSTRIES, INC.**

**736—Coagulant Aids** — Product reports and case studies available on seven new Claracel formulations — effective flocculating agents and coagulant aids for use in potable water supply systems. — **THE NORTH AMERICAN MOGUL PRODUCTS COMPANY.**

**752—Automatic Water Control** — 4-page bulletin describes the Chemtrol, the new automatic control for treatment of cooling tower water.

Adaptable to any size unit, in any location, and to any type water, it controls pH, prevents scale, controls corrosion and eliminates algae—all simultaneously, completely automatically and economically. — **WATER SERVICES INC.**

**756—Refrigeration Problems?**—VMC compressors, intercoolers, chillers, described in Bulletin 817 — design improvements, protective devices and factory-run-in-tests. — **THE VILTER MANUFACTURING COMPANY.**

## KEEP UP-TO-DATE USE SPI READER SERVICE

See pages 69 & 70

**757—Boiler Water Treatment**—Data sheets P-101 through P-107 summarize products and their application. — **FULBRIGHT LABORATORIES, INC.**

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### Late Bulletins

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**P-2—Luminaries**—Booklet SA 8868, 6 pages, shows typical applications and points out various features of surface-mounted fluorescent luminaries. — WESTINGHOUSE ELECTRIC CORP., Lighting Division, Edgewater Park, Cleveland, Ohio.

**P-3—Timing-Belt Drives**—Catalog No. 19103, 80 pages, contains the information needed to select the proper timing-belt drive for mechanical power transmission with minimum arithmetic. — T. B. WOOD'S SONS CO., Chambersburg, Pa.

**P-4—Totalizing Flow Meter** — Ref. No. 400.20-1, 4 pages, lists specifications, sizes, accessories, and gives

other pertinent data on the "Shunt-flow" meter for measurement of steam, air or gas in lines 1 in. or larger. — B-I-F INDUSTRIES, INC., P. O. Box 276, Providence 1, R. I.

**P-5—Semi-Rigid Pipe** — Brochure TR-273A, 4 pages, contains tabular data on physical properties, rated working pressures, sizes and weights of ABS plastic pipe, with suggested applications. — JOHNS-MANVILLE, 22 East 40th St., New York 16, N. Y.

**P-6—Silicones**—Booklet, 16 pages, covers silicone fluids, resins, rubber compounds, water repellants, anti-foams and emulsions, and their adaptability for industrial use. — UNION CARBIDE CORPORATION, Silicones Division, 270 Park Ave., New York 17, N. Y.

**P-7—Water Treatment** — Technical reprint T-183, 10 pages, entitled "Water Treatment for High Makeup Boilers Operating in the Range of 600 to 1,250 Lb." examines basic types of treatment and evaluates their use. — GRAVER WATER CONDITIONING CO., 216 West 14th St., New York 11, N. Y.

**P-8—Industrial Water Pipe** — Brochure TR-254A, 10 pages, describes Transite asbestos-cement industrial water pipe products, with design data and guide specifications for materials and installation. — JOHNS-MANVILLE, 22 East 40th St., New York 16, N. Y.

**P-9—Jet Compressors**—Bulletin 4F, 16 pages, details construction, operation and application information on line of jet compressors, including fixed-nozzle, manually controlled spindle, and automatically controlled spindle types. — SCHUTTE AND KOERTING COMPANY, Dept. JA-33, Cornwells Heights, Bucks County, Pa.

**P-10—Controllers**—Catalog C-15-2a, 56 pages, covers "Electronik" controllers, both pneumatic and electric. Gives design features, chart listings, and illustrations. — MINNEAPOLIS-HONEYWELL REGULATOR COMPANY, Industrial Div., Wayne & Windrim Avenues, Philadelphia 44, Pa.

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**P-11—Adjustable Speed Drives** — Bulletin 2900, 6 pages, outlines features of adjustable speed drives for applications in the  $\frac{1}{2}$  to 2500 hp drive range, and describes four complete packaged types. — THE LOUIS ALLIS COMPANY, Dept. P, 427 E. Stewart St., Milwaukee, Wis.

**P-12—Boiler Cleaning Control** — Technical Bulletin, 14 pages, provides specifications, describes features, and shows possible combinations of various "Selectromatic" boiler cleaning control systems. — DIAMOND POWER SPECIALTY CORP., Lancaster, Ohio.

**P-13—Boiler Water Gages** — Data Unit #393, 2 pages, covers high pressure boiler water gages and valves, featuring more inches of visibility within centers available, and special offset single piece gage chamber. — JERGUSON GAGE & VALVE COMPANY, 80 Adams St., Burlington, Mass.

**P-14—Thermostatic Trap** — Form 5020, 2 pages, outlines advantages in providing non-cycling modulated flow through a thermostatic steam trap. Illustrated with photograph and charts. — THE C. E. SQUIRES COMPANY, 18502 Syracuse Ave., Cleveland 10, Ohio.

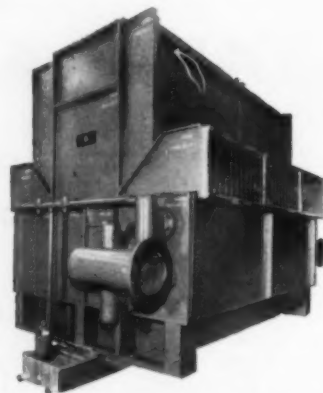
**P-15—Graphite Centrifugal Pumps** — Catalog Section S-7253, 4 pages, describes four basic sizes of "Karbate" impervious graphite centrifugal pumps, with capacities up to 140 gpm and heads up to 67 ft. — NATIONAL CARBON COMPANY, 270 Park Ave., New York 17, N. Y.

**P-16—Plastic Pipe**—Brochure TR-270A, 10 pages, complete with photographs and tables, gives properties, working pressure, flow chart, and other pertinent information on J-M Supreme Plastic Pipe. — JOHNS-MANVILLE CORPORATION, 22 East 40th St., New York 16, N. Y.

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**P-17—Synchronous Motors**—Bulletin 1100-PRD-247, 2 pages, describes line of vertical synchronous motors, 250 hp and up, particularly suited for vertical pump drive.—ELECTRIC MACHINERY MFG. COMPANY, Minneapolis 13, Minn.

**P-18—Pressure-Temperature Ratings**—Technical Bulletin TB1-1960, 24 pages, tabulates pressure-temperature ratings of carbon steel, molybdenum, chromemolybdenum and chromium silicon molybdenum alloys in all standard sizes of seamless piping. Prepared by the Engineering Standards Committee, the first single copy is free and additional copies are \$2.00 each.—THE PIPE FABRICATOR INSTITUTE, Suite 759, One Gateway Center, Pittsburgh, Pa.

**P-19—Rotary Compressor**—Bulletin No. ACO 100.4, 18 pages, describes a new heavy-duty rotary compressor for general purpose services, particularly in chemical, petrochemical, and heavy mass-production industries.—FAIRBANKS, MORSE & CO., Compressor Division, 600 S. Michigan Ave., Chicago 5, Ill.

**P-20—Flexible Couplings**—Bulletin 4100, 24 pages, presents line of torsionally resilient "Steelflex" couplings. Charts and tables contain engineering data.—THE FALK CORPORATION, Box 492, Milwaukee 1.

**P-21—Dust Collection**—Bulletin, 4 pages, describes Buell-Norblo dust collecting, recovery, and classi-

fying equipment for a broad area of industrial applications.—BUELL ENGINEERING CO., INC., 123 William St., New York 38, N. Y.

**P-22—High Voltage Control**—Bulletin 14B9739, 8 pages, introduces the 2000-5000 volt range "Space-Maker" drawout motor controller, a two-high motor control center designed to save space and lower installation costs.—ALLIS-CHALMERS MANUFACTURING COMPANY, Milwaukee 1, Wis.

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**P-23—Electronic Air Cleaners**—Catalog 1450, 8 pages, discusses characteristics of electronic air cleaners and tells how they can be applied to collect oil mists produced by industrial machine tools.—STURTEVANT DIVISION, Westinghouse Electric Corporation, Damon Road, Boston 36, Mass.

**P-24—Heat Exchangers**—Bulletin No. 302.1K1, 12 pages, gives design and dimensional data for Type

CP and Type CPR standard heat exchanger lines. Photographs show typical installations.—AMERICAN-STANDARD INDUSTRIAL DIVISION, Detroit 32, Mich.

**P-25—Automated Boiler Operation**—Bulletin G-101, 10 pages, is a study of the current status and future of boiler automation, which was presented as a paper to the ASME-AIEE Power Conference.—THE BABCOCK & WILCOX COMPANY, 161 E. 42nd St., New York.

**P-26—Control Linkage**—Brochure No. P81-5, 12 pages, illustrates typical linkage arrangements for fan damper control, stoker speed control, coal feeder gate control and feed pump fluid coupling control.—BAILEY METER COMPANY, 1050 Ivanhoe Road, Cleveland 10, Ohio.

**P-27—Hot Water Converters**—Bulletin 71, 20 pages, presents a new line of "NiaWel" hot water converters designed specifically for space heating service.—NIAGARA WELDMENTS INC., 55 Portage Road, Niagara Falls, N. Y.

**P-28—Single Stage Pumps**—Bulletin No. 721.6, 16 pages, shows specifications, performance curves and dimensions, and gives interchangeability chart and other pertinent facts on 34 sizes of Model 3405 single stage, double suction centrifugal pumps.—GOULDS PUMPS, INC., 219 Black Brook Road, Seneca Falls, N. Y.

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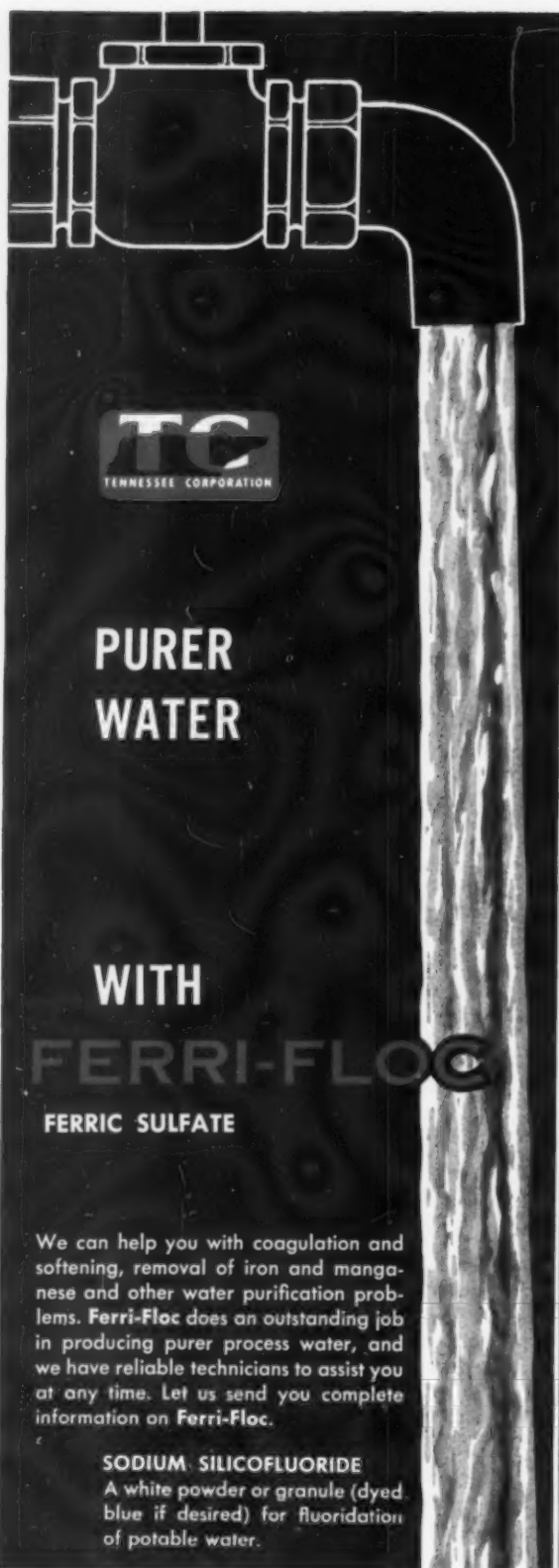
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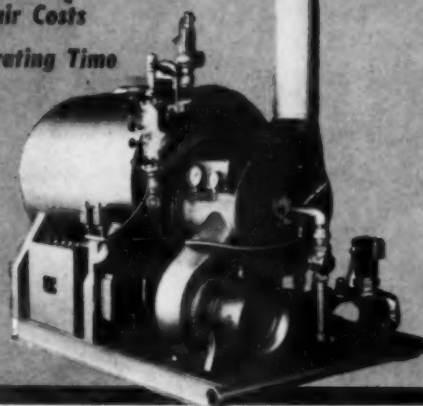
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